United States
Department of
Agriculture

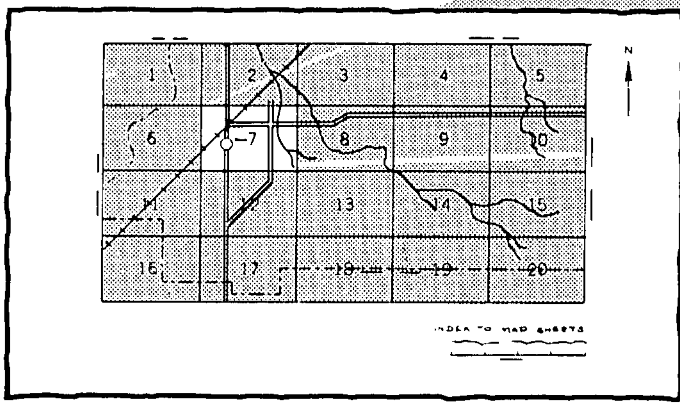
Soil
Conservation
Service

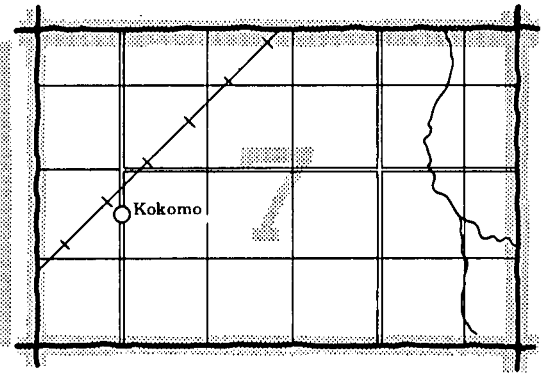
In cooperation with
Cornell University
Agricultural
Experiment Station

Soil Survey of Chenango County, New York

HOW TO USE

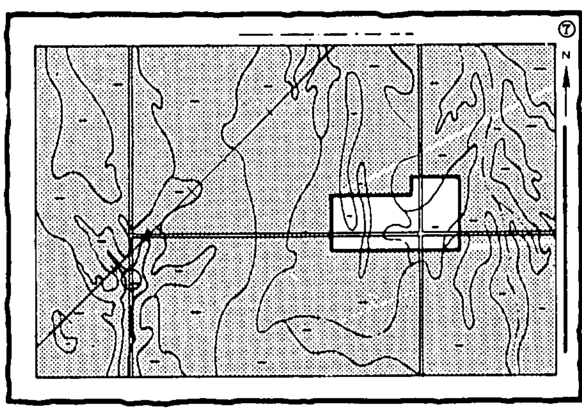
1. Locate your area of interest on the "Index to Map Sheets"

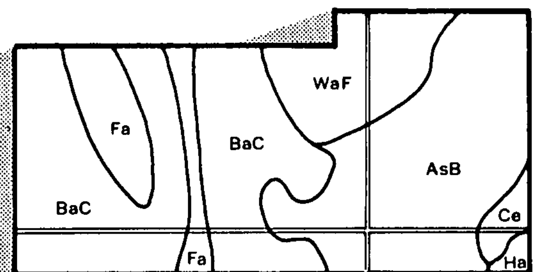




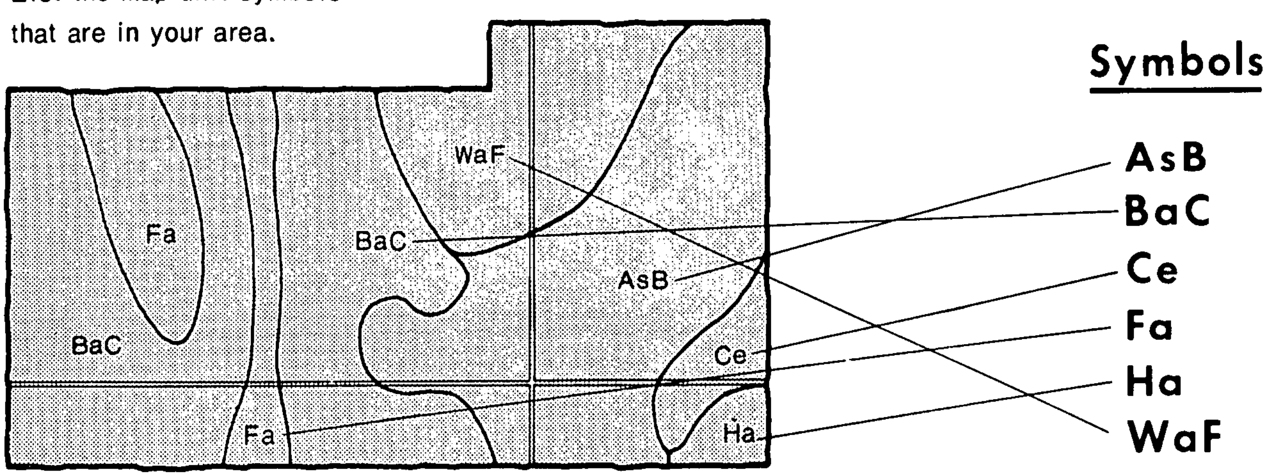
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



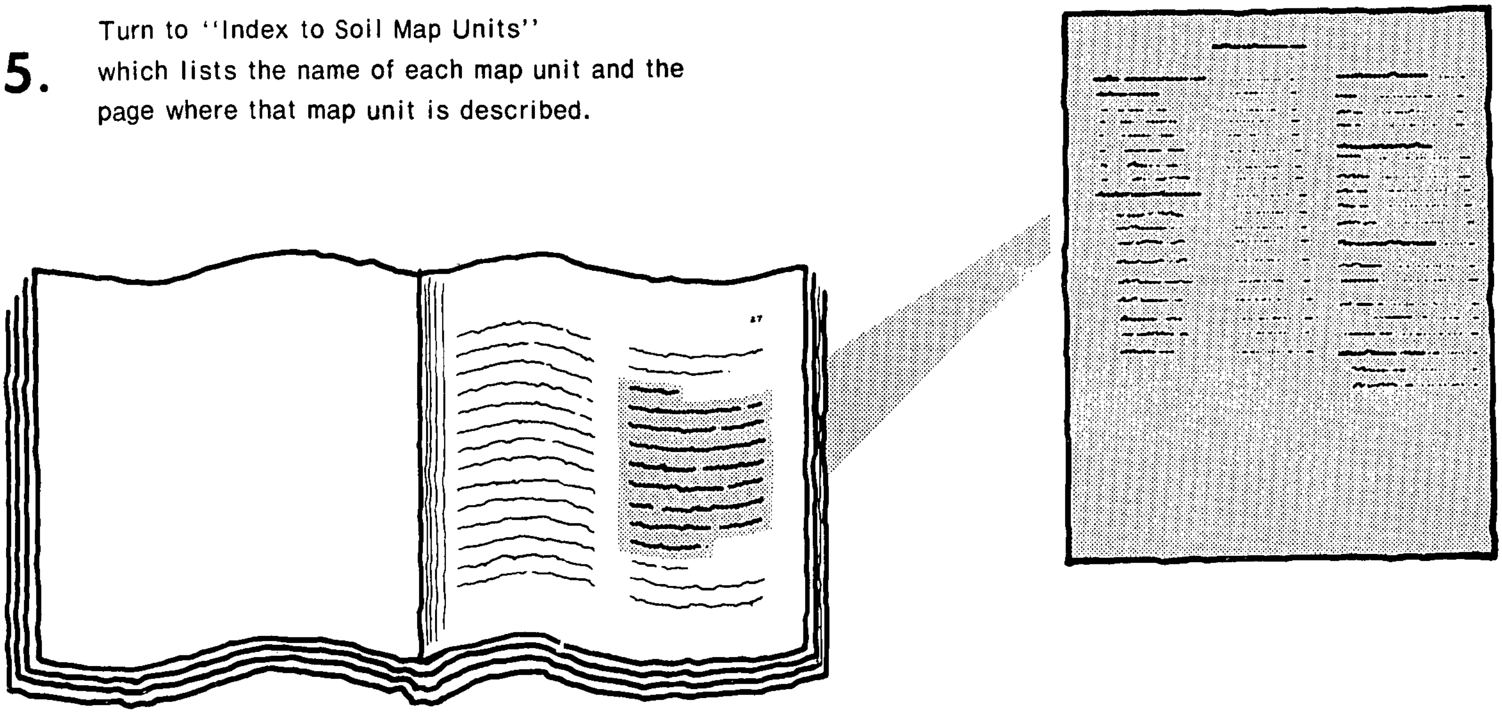


4. List the map unit symbols that are in your area.

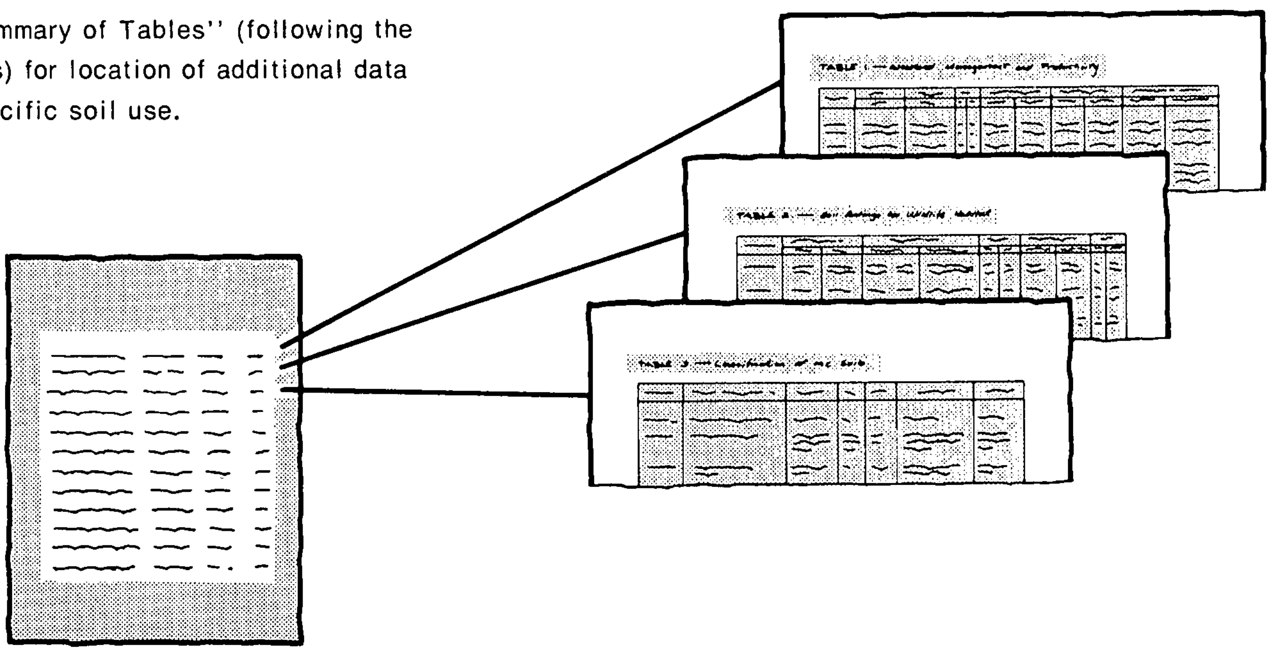


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed and soil names and descriptions were approved in 1981. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1981. This survey was made cooperatively by the Soil Conservation Service and the Cornell University Agricultural Experiment Station. It is part of the technical assistance furnished to the Chenango Soil and Water Conservation District, which provided part of the funding for this survey.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: A typical landscape in a small valley in the county. The farmland is on Chenango soils, and the steep forested areas in the background are Mardin and Lordstown soils.

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Soil Series

Issued December 1985

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Chenango County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

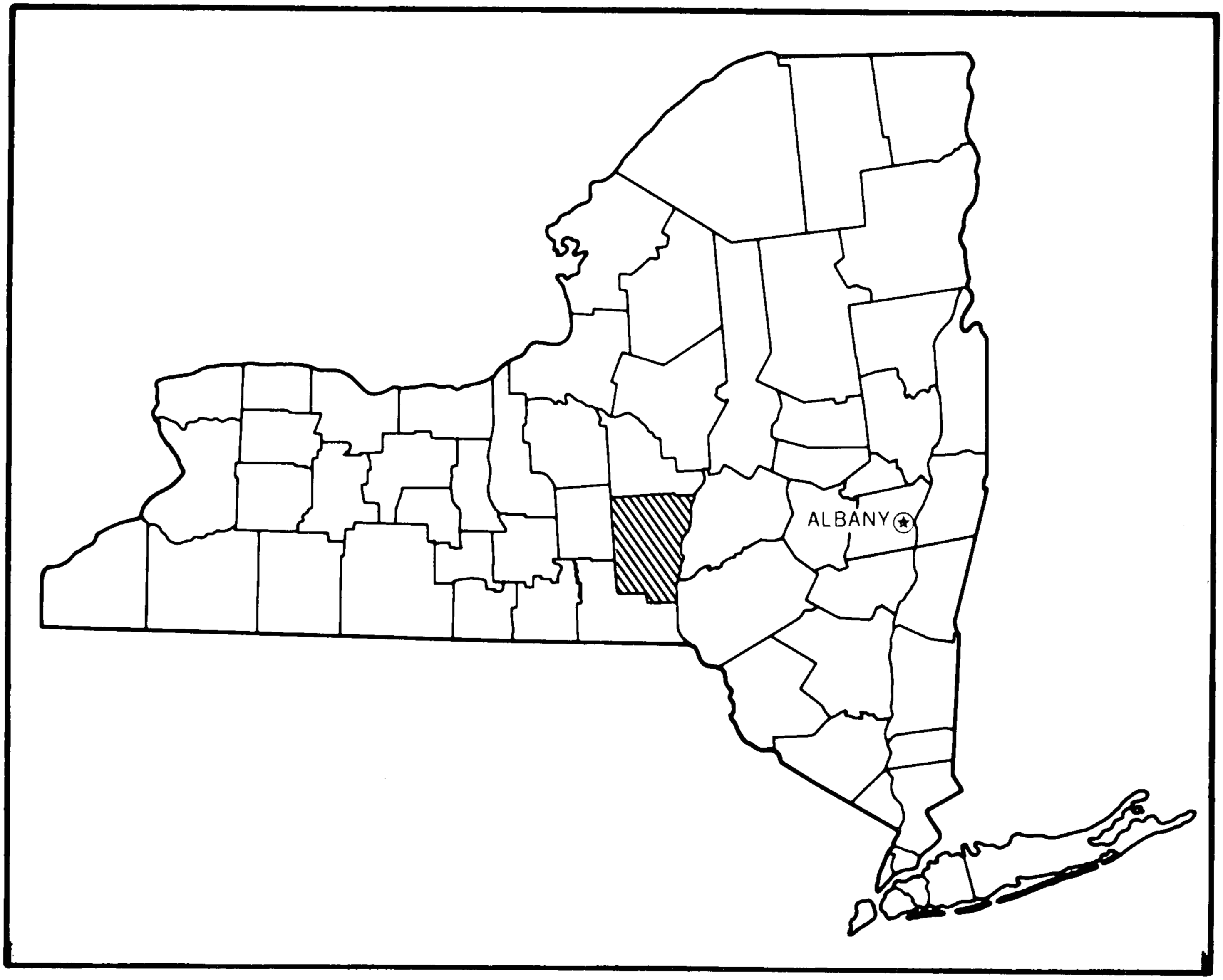
This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Paul A Dodd

Paul A. Dodd
State Conservationist
Soil Conservation Service



Location of Chenango County in New York.

Soil Survey of Chenango County, New York

By Leslie Crandall, Soil Conservation Service

Fieldwork by C. Erwin Rice, Burton R. Laux, John P. Wulforst, Russell A. Parsons, David J. Hvizdak, Garry C. Nightingale, and Leslie Crandall, Soil Conservation Service, and Donald F. Rapparlie, Cornell University Agricultural Experiment Station

United States Department of Agriculture
Soil Conservation Service
in cooperation with
Cornell University Agricultural Experiment Station

CHENANGO COUNTY is in the south-central part of New York State and is 908 square miles, or 581,120 acres. Norwich, the county seat, is in the Chenango River Valley in the eastern part of the county.

Chenango County was formed from parts of Herkimer and Tioga Counties in 1798. At that time, the area contained what is now Madison County and the Town of Sangerfield in Oneida County. The present boundaries were fixed in 1840.

The first settlers in the county, known as the Vermont Sufferers, came in 1786 to an area near what is now Bainbridge, and a colony of French settled near Greene in 1792.

The county is in the glaciated Allegheny Plateaus. Most of the soils are suited to and used for dairy farming and a wide variety of nonfarm uses. Providing drainage is one of the major concerns of soil management, and the very wet soils need extensive drainage to make them suitable for crop production. Erosion is a hazard on the sloping to steep soils, most of which are in pasture or woodland.

According to the 1974 Census of Agriculture (*6*), about 45 percent of the county was in farms, 23 percent of which was cropland and pasture. Slightly more than half of the county is in forestland.

This survey provides updated and additional information to a soil survey of Chenango County published in 1918, and has maps that show the soils in greater detail.

General Nature of the Survey Area

This section describes some of the natural and cultural factors that affect land use in Chenango County.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

The higher elevations in the county are markedly cooler than the main agricultural areas in the lowlands. Precipitation is well distributed throughout the year and is nearly always adequate for all crops. Winter snows occur frequently, occasionally as blizzards, and cover the ground much of the time.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Norwich in the period 1951 to 1979. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 22 degrees F, and the average daily minimum temperature is 12 degrees. The lowest temperature on record, which oc-

curred at Norwich on January 15, 1957, is -32 degrees. In summer the average temperature is 65 degrees, and the average daily maximum temperature is 78 degrees. The highest recorded temperature, which occurred at Norwich on September 4, 1953, is 99 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 40 inches. Of this, 22 inches, or 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The heaviest 1-day rainfall during the period of record was 3.11 inches at Norwich on July 10, 1952. Thunderstorms occur on about 31 days each year, and most occur in summer.

The average seasonal snowfall is 70 inches. The greatest snow depth at any one time during the period of record was 53 inches. On an average of 35 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 65 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 40 percent in winter. The prevailing wind is from the west-southwest. Average windspeed is highest, 12 miles per hour, in winter.

Physiography and Geology

Bernard S. Ellis, geologist, Soil Conservation Service, assisted with this section.

Chenango County is in the Allegheny Plateaus physiographic province. The topography of the county ranges from rolling to steep; the steeper areas are near the major drainageways. Wide ridgetops and nearly flat-topped hills are between most of the valleys. The major stream valleys are quite broad despite the steepness of the topography in the county.

The elevation of the county ranges from a low of 880 feet above sea level at the point near where the Chenango River enters Broome County to a high of 1,960 feet at three locations: Berry Hill, which is 8 miles west of Norwich; Skinner Hill, located 8 miles northeast of Norwich; and an unnamed hill 3 miles east of Norwich. The elevation in the county is high for New York State. With the exception of the Adirondacks and the Catskill Mountains, very few areas in the State reach an elevation of near 2,000 feet. The elevations in the major river valleys in the county are in the range of 900 to 1,000 feet and rise to 1,400 to 1,500 feet in short distances near upper valley sides. About half of the county is above 1,500 feet in elevation, and about a quarter of that is above 1,800 feet.

Chenango County is underlain by bedrock of the Middle and Upper Devonian periods. The formations of rock outcrop are in areas aligned in a somewhat east-west direction. The oldest rock beds are in the northeastern corner of the county; the rock is progressively younger moving southward in the county (fig. 1).

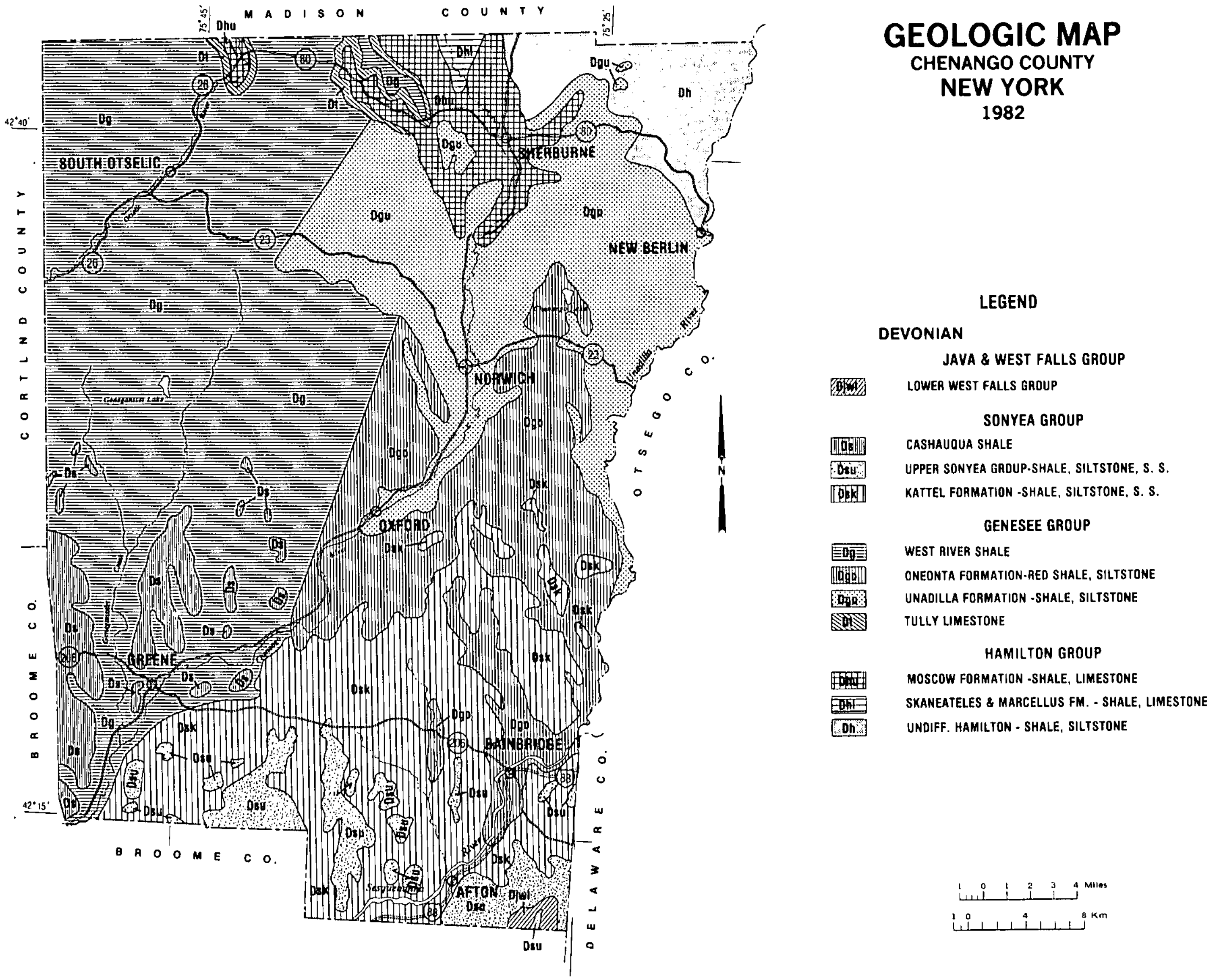


Figure 1.—Bedrock geology map of Chenango County.

The oldest bedrock formation is called the Hamilton Group. It is in the northeastern corner of the county and in the northern Otselic River Valley. The rock is shale and siltstone.

The Hamilton group is overlain by the extensive Genesee Group, which is in a 25-mile-wide band from the northern border south. Included in this group is the Sherburne Formation, named for an exposure in the town of Sherburne of a flaggy, bluish, fine-grained sandstone alternating with smooth, greenish or olive-colored shale. Also included in this group is the red Oneonta Formation. The rock in this formation is somewhat more massive and is the only material that was derived from terrestrial rather than marine sediments. This formation covers about 100 square miles in the east-central part of the county.

The Genesee Group is overlain by the Sonyea Group, which is in a 10-mile-wide band in the southern part of the county. It consists of sandstone, siltstone, and shales.

The youngest and smallest group is the Java and West Falls Group. It is sandstone, siltstone, and shale and is exposed in the extreme southeastern corner of the county in a 3-square-mile area.

Chenango County was covered and uncovered by several advances and retreats of glacial ice. The ice first covered the area about 300,000 years ago, and the last retreat was 10,000 to 15,000 years ago. With each advance the ice picked up soil material and bedrock and redeposited a mixture of unconsolidated material of various sizes, shapes, and mineralogy.

As a result of these variations in material, different soils formed in these deposits. The most common deposit in the county is glacial till. Till is a heterogeneous mixture of particles carried and deposited directly by the glacier. Mardin and Wellsboro soils are examples of soils that formed in glacial till. Glacial till deposits are throughout the county on hilltops and ridges.

Meltwater from the glacial ice deposited sand, gravel, and cobblestones as the velocity of the water slowed. Many of these outwash deposits are near present-day drainageways. Howard and Chenango soils formed in these outwash deposits.

Alluvial deposits have accumulated at the mouths of steep streams in the form of fans where the velocity of the water from the glacier slowed and the sand and gravel dropped out of suspension. The Chenango fan phase and the Trestle soils are on these fan deposits. Other loamy alluvial deposits are in a long, narrow area along the water courses in valleys; Hamlin and Teel soils have developed in these deposits of recent alluvium.

Drainage

Most of the major streams in the county flow toward the southwest and eventually into the Susquehanna River system in the southeastern corner of the county.

The major streams are the Unadilla River, which forms the eastern boundary between Chenango and Otsego Counties; Genegantslet Creek, which drains the west-central part of the county; the Chenango River in the central part of the county; and the Otselic River in the northwestern corner of the county.

Most of the smaller tributaries are high-gradient, straight streams. The larger streams and rivers have lower gradients, which result in some meandering.

Water Supply

The three main sources of water in Chenango County are dug and drilled wells, developed springs, and surface water from small impoundments.

Communities use one or a combination of those sources to obtain their water supply. The City of Norwich uses a reservoir. The towns of Mount Upton and Afton use a combination of developed springs and drilled wells.

Domestic water for rural areas of the county is obtained from wells drilled into bedrock and a few dug wells. Some farms use developed springs as a water source.

Several of the communities with drilled wells have large storage tanks with gravity flow for reserve sources. Others have supplies from large-capacity wells. The use of developed springs in communities is mainly a secondary or supplemental source. However, in rural areas these springs can be the primary water source. Long dry periods during midsummer cause some of these springs to go temporarily dry.

Aquifiers with the most potential are in the major river valleys, but individual wells in the Chenango River Valley yield an inadequate supply for some small industries.

Farming

Although the number of farms decreased from 1,196 in 1969 to 1,103 in 1974, farming still is the major industry in Chenango County. The average size of each farm increased from 229 acres to 237 acres during the same period, and in 1974, 45 percent of the land area in Chenango County was in farms (*6*). Of the 1,103 farms, 735 were classified as commercial. The land in farms included 134,645 acres of cropland, of which 40,535 acres was used only for pasture and grazing; 68,935 acres of woodland, including woodland pasture; and 58,148 acres of all other land, which includes permanent pastures and land for other uses.

The dominant crops are hay and field corn. In 1974, 64,581 acres was used for hay production and 21,053 acres for corn, of which 16,396 acres was for silage and 4,657 acres was for grain. Some cabbage is produced in the county in the Chenango River Valley.

The number of dairy cows increased slightly from 28,608 in 1969 to 28,884 in 1974. During that period, the

number of beef cattle, hogs, and horses increased and sheep and poultry declined.

Transportation and Industry

The principal east-west highways in Chenango County are State Routes 88, 206, 23 and 80. The main north-south highways are State Routes 26, 12 and 8. The county is served by two railroad systems. One runs through Afton and Bainbridge from Binghamton to Oneonta, and the other connects Binghamton and Utica. Two airports in the county, located at Sidney and Norwich, handle private and light commercial aircraft.

Dairying is the major agricultural industry in Chenango County. Most milk is shipped to the larger cities near the county. Maple sugar products provide an important industry, and logging and wood processing are common in the region. Many small industries in the Chenango Valley section produce such items as log cabins, machinery, clothing, wood products, sand and gravel, and medicines; some provide food processing.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind or segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another resulting in gradual changes in characteristics. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size, and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soil. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation to precisely define and locate the soils is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The general soil map units in Chenango County are described in this section. The textures given in the heading for each unit apply to the surface layer of the major soils. The terms that describe drainage also apply only to the major soils. Some map units contain soils that are less sloping or more sloping than the range given in the heading; the text indicates the range of slope within the unit.

The names and boundaries on the general soil map of Chenango County do not in all instances match those on the general soil maps of adjacent counties. The differences are the result of changes in the system of classifying and naming soils, differences in the scales used for the maps, and differences in the proportion of major soils between one survey area and another.

Soil Descriptions

1. Bath-Valois-Chenango

Dominantly undulating to hilly, deep, well drained to somewhat excessively drained, medium-textured soils on valley sides and valley floors

This unit consists of soils that formed in glacial till and glacial outwash deposits. Slopes range from 0 to 35 percent but dominantly are 3 to 25 percent.

This unit makes up about 11 percent of the survey area. The unit is about 35 percent Bath soils, 20 percent Valois soils, 20 percent Chenango soils, and 25 percent soils of minor extent.

The Bath soils are well drained and formed in glacial till derived mainly from siltstone, sandstone, and shale. They have a firm and brittle subsoil at a depth of 26 to 36 inches. The rate of water movement through the soil is moderate above the firm layer, and slow or very slow in and below the firm layer. The Bath soils are dominantly on undulating to hilly lower valley side slopes just above the valley floors.

The Valois soils are well drained and formed in glacial till derived mainly from siltstone, sandstone, and shale. They are similar to Bath soils but do not have the firm and dense subsoil. The rate of water movement through the soil is moderate in the surface layer and subsoil and moderate to moderately rapid in the substratum. The substratum generally is friable and has a high content of gravel. The soils are dominantly on undulating to hilly foot slopes just above the valley floor.

The Chenango soils are well drained to somewhat excessively drained and formed in glacial outwash deposits. They do not have the firm subsoil typical of the Bath soils. The rate of water movement through the soil is moderate to moderately rapid in the surface layer and subsoil and rapid in the substratum. These soils are dominantly on gently sloping or sloping terraces along the floor of major valleys. Some areas are fan shaped where tributary streams enter main valleys.

The main soils of minor extent are Teel, Hamlin, Castile, Atherton, Volusia, Mardin, and Lordstown soils. Deep, moderately well drained and somewhat poorly drained Teel soils and deep, well drained Hamlin soils are intermingled on flood plains on valley floors. Deep, very poorly drained and poorly drained Atherton soils and deep, moderately well drained Castile soils are in depressions and low lying areas on terraces. Deep, somewhat poorly drained Volusia soils are on concave toe slopes above valley floors. Deep, moderately well drained Mardin soils are on lower hillsides and valley sides that receive runoff from higher adjacent soils. Moderately deep, well drained Lordstown soils are on benched lower valley side slopes that are underlain with bedrock.

Most areas of this unit are used for dairy farming. Some of the steeper areas are in woodland.

The major limitations for farming are low fertility, high acidity, and an erosion hazard, particularly in the steeper areas. Droughtiness is a limitation in the Chenango soils.

This unit is suited to most types of community development and recreational uses. The slope in places and the slow or very slow rate of water movement through the lower part of the subsoil in the Bath soils are the main limitations.

2. Lansing-Lordstown-Howard

Dominantly gently sloping to steep, deep and moderately deep, well drained and somewhat excessively drained, medium-textured soils on valley sides and valley floors

This unit consists of soils formed in glacial till and glacial outwash deposits. Slopes range from 0 to 50 percent but range mainly from 3 to 35 percent.

This unit makes up about 1 percent of the survey area. The unit is about 25 percent Lansing soils, 20 percent Lordstown soils, 15 percent Howard soils, and 40 percent soils of minor extent.

The Lansing soils formed in glacial till derived mainly from sandstone, siltstone, shale, and limestone. They are deep, are well drained, and have high fertility. The rate of water movement through the soil is moderate in the surface layer and subsoil and slow in the substratum. The soils are dominantly on gently sloping to moderately steep valley sides, hillsides, and knolls.

The Lordstown soils formed in glacial till derived mainly from sandstone, siltstone, shale, and limestone. They are moderately deep, well drained, and highly acidic and have low fertility. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through the soil is moderate. The soils are dominantly on gently sloping to steep ridges and knolls and benched valley sides. The Lordstown soils are generally on higher landscapes than the Lansing soils.

The Howard soils are deep and well drained to somewhat excessively drained and formed in gravelly glacial outwash. They have moderately high fertility. The rate of water movement through the soil is moderate or moderately rapid in the subsoil and rapid in the substratum. The soils are dominantly on gently sloping to steep lower valley sides and on terraces along valley floors.

The main soils of minor extent are Greene, Valois, Bath, Oquaga, Phelps, and Atherton soils. Moderately deep, somewhat poorly drained and poorly drained Greene soils are on benched, flat hilltops and concave hillsides. Valois and Bath soils are deep and well drained and are along lower valley sides. Moderately deep, well drained to excessively drained Oquaga soils are in areas where the soil material is red. Deep, moderately well drained Phelps soils and deep, poorly drained and very poorly drained Atherton soils are in depressional areas and low-lying areas near Howard soils.

Most areas of this unit are used for crops on dairy farms. Some areas of the Lordstown soils and some of the steeper areas are pastured or in woodland.

The main management concern for farming in this unit is controlling soil erosion, particularly on the steeper areas.

The depth to bedrock in the Lordstown soils and slope are the main limitations of this unit for community development.

3. Volusia-Mardin-Lordstown

Dominantly gently sloping to steep, deep and moderately deep, somewhat poorly drained to well drained, medium-textured soils on uplands

This unit consists of soils formed in glacial till deposits (fig. 2). The landscape consists of rolling ridges, hills, and hilltops on the upland plateau. Slopes range from 0 to 50 percent but mainly range from 3 to 35 percent.

This unit makes up about 39 percent of the survey area. Volusia soils make up about 30 percent of the unit, Mardin soils about 30 percent, Lordstown soils about 20 percent, and soils of minor extent about 20 percent.

Volusia soils are somewhat poorly drained and deep. They have a firm and brittle subsoil at a depth of 10 to 20 inches. The rate of water movement through the soil is moderate above the firm layer and slow or very slow in and below the firm layer. A seasonal high water table is perched above the subsoil in winter and spring. The soils are dominantly on gently sloping or sloping, broad hilltops and foot slopes.

Mardin soils are moderately well drained and deep. They have a firm and brittle layer in the lower part of the subsoil at a depth of 14 to 26 inches. The rate of water movement through the soil is moderate above the firm layer and slow or very slow in and below the firm layer. The soils are on gently sloping to steep, hilltops, knolls, and slightly convex side slopes. Mardin soils commonly are adjacent to Volusia soils but are above the Volusia soils and receive less runoff.

The Lordstown soils are moderately deep and well drained and have bedrock at a depth of 20 to 40 inches. They do not have the firm subsoil typical of the Volusia and Mardin soils. The rate of water movement through the soil is moderate. These soils are dominantly on gently sloping to steep hilltops and upper hillsides where the topography is influenced by the underlying bedrock.

The main soils of minor extent are Arnot, Greene, Bath, Chippewa, Valois, Lackawanna, Wellsboro, Morris, and Norwich soils. Shallow, somewhat excessively drained and well drained Arnot soils are on hilltops and benches. Moderately deep, somewhat poorly drained and poorly drained Greene soils are in low-lying and concave areas on hilltops and benches. Deep, poorly drained and very poorly drained Chippewa soils are in depressional areas. Deep, well drained Valois soils are on steep foot slopes. Deep, well drained Lackawanna soils and moderately well drained, deep Wellsboro soils are on hillsides and hilltops where the soil is red. Deep, somewhat poorly drained Morris soils and deep, poorly drained and very poorly drained Norwich soils are on flat hilltops and in depressional areas where the soil material

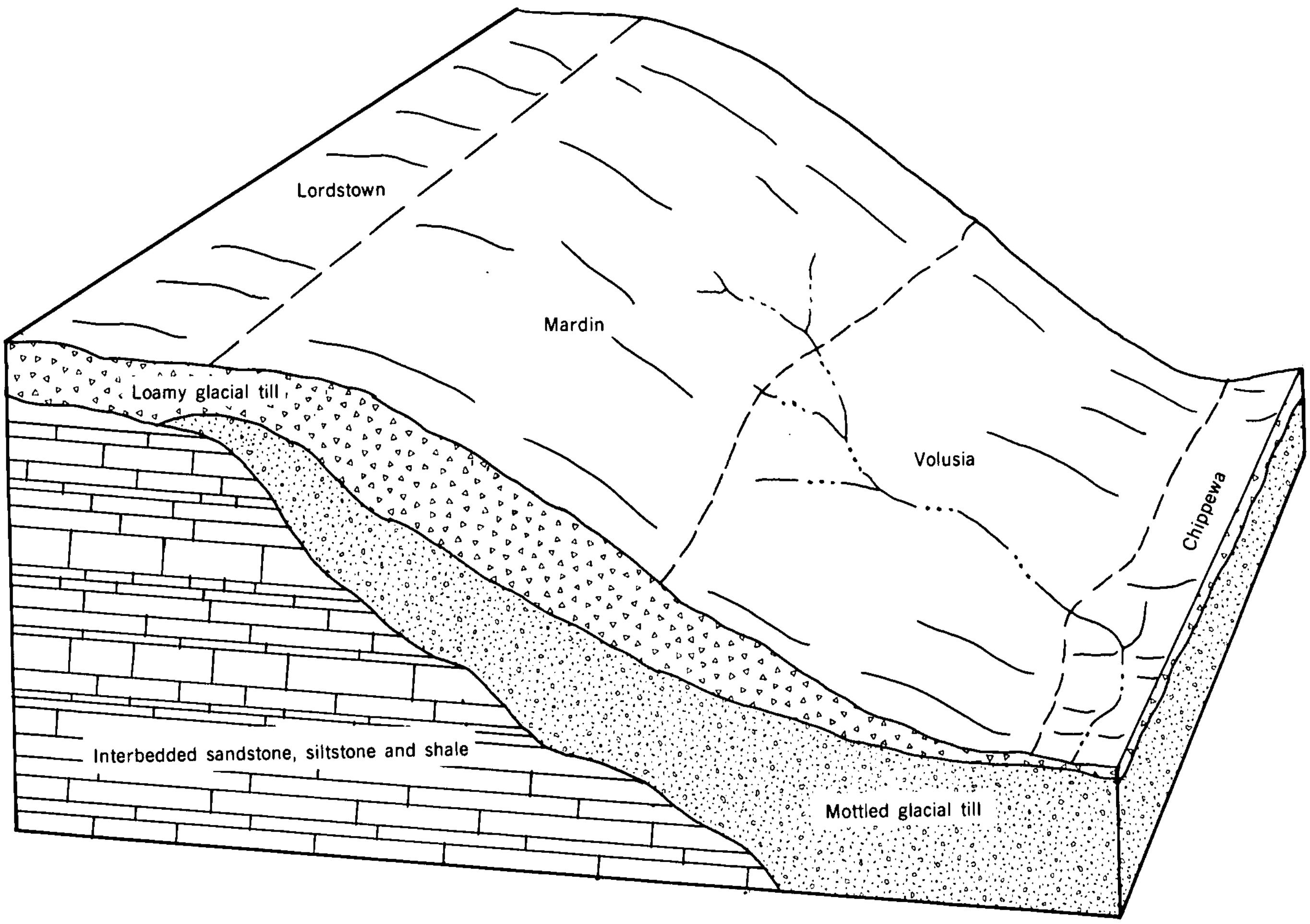


Figure 2.—Typical pattern of soils and underlying material in the Volusia-Mardin-Lordstown map unit.

is red. Some areas of the unit have stones and boulders on the surface.

Most areas of this unit are forested. Some areas are used for pasture, hay, and corn.

The seasonal high water table in the Volusia soils and the depth to bedrock in the Lordstown soils are the main limitations for farming. Rooting is restricted in the unit by the firm subsoil layers or bedrock.

The main limitations of the unit for community development are the seasonal high water table in the Volusia and Mardin soils, the depth to bedrock in the Lordstown soils, and the slope in places.

4. Wellsboro-Oquaga-Morris

Dominantly gently sloping to moderately steep, deep and moderately deep, excessively drained to somewhat poorly drained, medium-textured soils on uplands

This unit consists of soils formed in glacial till deposits. The till is derived from red shale and siltstone. The landscape is a rolling upland with steeper slopes along valley sides. Slopes range from 0 to 50 percent but are dominantly 3 to 25 percent.

This unit makes up about 8 percent of the survey area. Wellsboro soils make up about 30 percent of the unit, Oquaga soils about 25 percent, Morris soils about 25 percent, and soils of minor extent about 20 percent.

The Wellsboro soils are moderately well drained and deep. They have a firm and brittle layer at a depth of 15 to 26 inches. The rate of water movement through the soil is moderate above the firm layer and slow in and below the firm layer. These soils are on gently sloping or sloping ridgetops and upper hillsides.

The Oquaga soils are well drained to excessively drained and are moderately deep. They have bedrock at a depth of 20 to 40 inches. They do not have the firm

layer typical of the Wellsboro and Morris soils. The rate of water movement through the soil is moderate. These soils are dominantly on gently sloping to moderately steep hilltops, hillsides, and valley sides where the topography is influenced by the underlying bedrock.

The Morris soils are somewhat poorly drained and deep. They have a firm and brittle layer at a depth of 10 to 22 inches. The rate of water movement through the soil is moderate above the firm layer and slow or very slow in the firm layer. A seasonal high water table is perched above the firm layer in winter and spring. These soils are dominantly on gently sloping or sloping concave foot slopes and in a few nearly level, low areas.

The main soils of minor extent are Arnot, Greene, Lordstown, Bath, Mardin, Volusia, Chippewa, Lackawanna, Norwich, and Valois soils. Shallow, somewhat excessively drained and well drained Arnot soils are on hilltops and benches. Moderately deep, somewhat poorly drained and poorly drained Greene soils are in low-lying areas on hilltops and benches. Moderately deep, well drained Lordstown soils; deep, well drained Bath soils; and deep, moderately well drained Mardin soils are on broad hilltops, knolls, and hillsides where the soil is brown. Deep, somewhat poorly drained Volusia soils are in low areas, slight depressions, and concave foot slopes where the soil is brown. Deep, well drained Lackawanna soils are on concave knolls and hilltops that receive little or no runoff. Deep, poorly drained and very poorly drained Norwich soils are in depressional and seep areas. Deep, well drained Valois soils are on steep valley sides. Many areas have stones and boulders on the surface.

Most areas of this unit are used for dairy farming. Many sloping areas are forested.

Low fertility and seasonal wetness are the major management concerns for crop production. Rooting commonly is limited by a firm layer or the depth to bedrock.

The main limitations for community development are seasonal wetness in the Wellsboro and Morris soils and the depth to bedrock in the Oquaga soils. Slopes are also a limitation in some areas.

5. Mardin-Lordstown-Volusia

Dominantly gently sloping or sloping, deep and moderately deep, well drained to somewhat poorly drained, medium-textured soils on uplands

This unit consists of soils that formed in glacial till derived from brown or gray shale and sandstone (fig. 3). The landscape is mainly a broad, rolling or undulating upland dissected by a few narrow valleys. Some areas of the landscape are benched. Slopes range from 0 to 50 percent but are mostly 3 to 15 percent.

This unit makes up about 26 percent of the county. The unit is about 35 percent Mardin soils, 30 percent Lordstown soils, 15 percent Volusia soils, and 20 percent soils of minor extent.

The Mardin soils are moderately well drained and deep. They have a firm and brittle subsoil at a depth of 14 to 26 inches. The rate of water movement through the soil is moderate above the firm layer and slow or very slow in and below the firm layer. These soils are dominantly on hilltops, hillsides, and knolls. These soils usually receive less runoff from adjacent soils than the Volusia soils.

The Lordstown soils are well drained and moderately deep. They have sandstone, siltstone, or shale bedrock at a depth of 20 to 40 inches. The rate of water movement through the soil is moderate. These soils are dominantly on benched hilltops, hillsides, and ridges mainly at slightly higher elevations than the Mardin soils.

The Volusia soils are somewhat poorly drained and deep. They have a firm and brittle subsoil at a depth of 10 to 20 inches. The rate of water movement is moderate above the firm layer and slow or very slow in and below the firm layer. A seasonal high water table is in the upper part of the subsoil during winter and spring. These soils are dominantly in low areas, in slight depressions, and on foot slopes.

The main soils of minor extent are Chippewa, Bath, Valois, Tuller, Greene, and Arnot soils. Deep, poorly drained and very poorly drained Chippewa soils are in depressional areas. Well drained Bath and Valois soils are on convex knolls and ridges that receive little runoff. Shallow, somewhat excessively drained and well drained Arnot soils are on hilltops. Shallow, poorly drained and somewhat poorly drained Tuller soils and moderately deep, somewhat poorly drained and poorly drained Greene soils are in depressional areas near Lordstown soils.

Most areas of this unit are in dairy farms. A few areas, mostly where the soils are wet or steep, are forested.

The major limitations of these soils for crop production are the seasonal high water table, low fertility, high acidity, and erosion on the steeper slopes. Rooting commonly is limited by a firm layer or bedrock.

The main limitations for community development are the depth to bedrock in the Lordstown soils and seasonal wetness in the Volusia and Mardin soils.

6. Lordstown-Mardin

Dominantly gently sloping to steep, moderately deep and deep, well drained and moderately well drained, medium-textured soils on uplands and valley sides

This unit consists of soils formed in moderately deep and deep glacial till deposits. Many areas of the landscape are benched. Slopes range from 3 to 50 percent but are dominantly 3 to 35 percent.

This unit makes up about 3 percent of the county. The unit is about 50 percent Lordstown soils, 30 percent Mardin soils, and 20 percent soils of minor extent.

The Lordstown soils are well drained and moderately deep. They have sandstone, siltstone, or shale bedrock

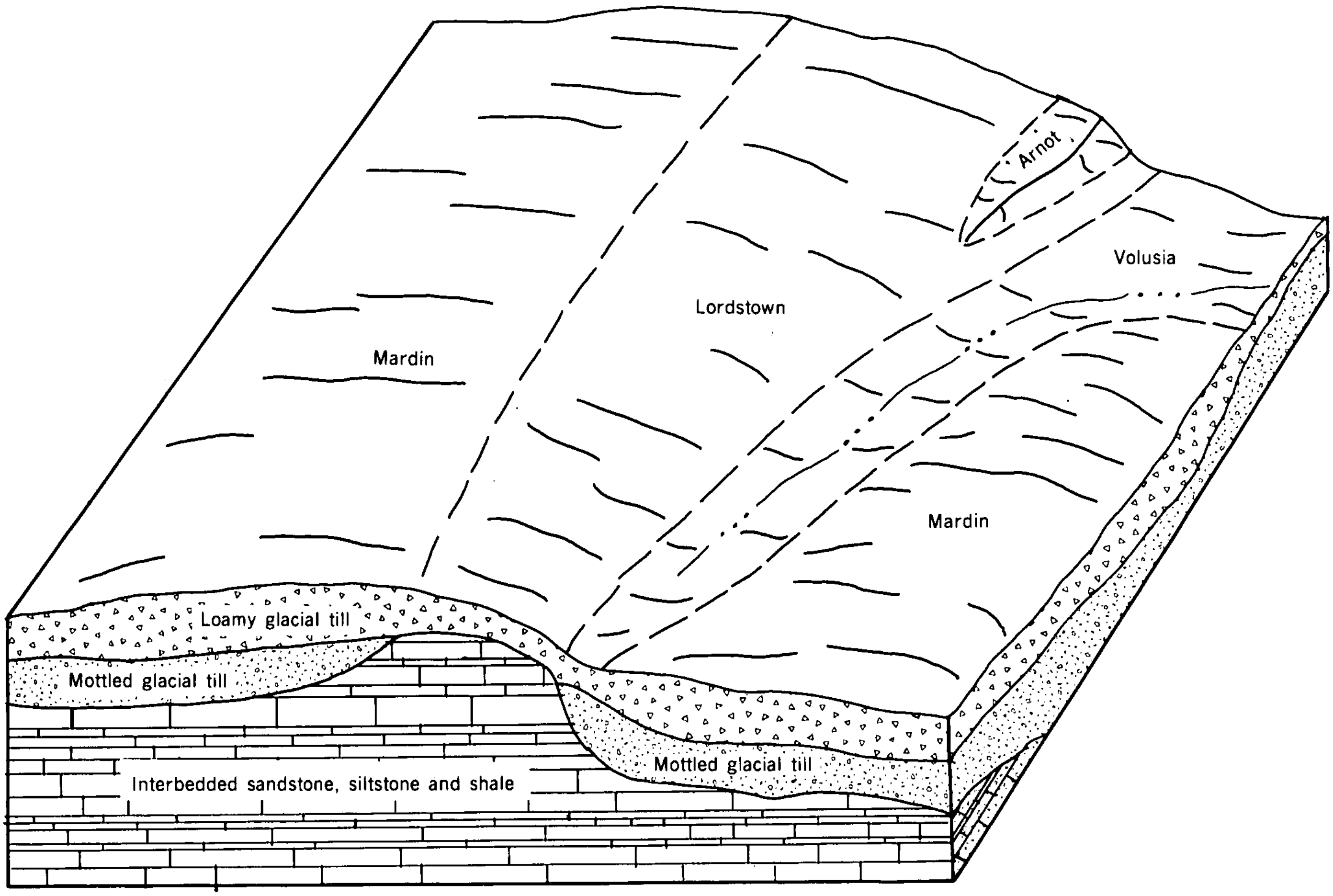


Figure 3.—Typical pattern of soils and underlying material in the Mardin-Lordstown-Volusia map unit.

at a depth of 20 to 40 inches but do not have the firm subsoil typical of the Mardin soils. The rate of water movement through the soil is moderate. The Lordstown soils are dominantly on benched hilltops, hillsides, and valley sides. In many areas these soils are at a slightly higher elevation than the Mardin soils.

The Mardin soils are moderately well drained and deep. They have a firm and brittle subsoil at a depth of 14 to 26 inches. The rate of water movement through these soils is moderate above the firm layer and slow or very slow in and below it. A seasonal high water table is perched above the firm layer in the spring for brief periods. The Mardin soils are dominantly on rolling hilltops and hillsides.

In the area south of Bainbridge, the main soils of minor extent are Volusia, Chippewa, Tuller, Greene, Bath, Valois, and Arnot soils. Deep, poorly drained and very poorly drained Chippewa soils and deep, somewhat poorly drained Volusia soils are in upland depressions, in level areas, and on foot slopes. Somewhat poorly drained and poorly drained, moderately deep Greene soils and the shallow Tuller soils are in level or depressional areas where bedrock is close to the surface. Deep, well drained Valois and Bath soils are on convex knolls and ridges that receive less runoff than the Mardin soils. Shallow, somewhat excessively drained and well drained Arnot soils are on hilltops near Lordstown soils. Many areas have stones and boulders on the surface.

In the area north of Bainbridge, the main soils of minor extent are red Morris, Norwich, Wellsboro, Lackawanna, and Oquaga soils and brown Valois, Tuller, Greene, and Arnot soils. Deep, poorly drained and very poorly drained Norwich soils and deep, somewhat poorly drained Morris soils are along drainageways in depressional areas and

on foot slopes. Deep, moderately well drained Wellsboro soils and moderately deep, well drained to excessively drained Oquaga soils are on hilltops and hillsides. Deep, well drained Lackawanna soils are on slightly higher landscape positions than the Wellsboro soils. The Valois, Tuller, Greene, and Arnot soils are on landscape positions similar to those in the area south of Bainbridge. Many areas have stones and boulders on the surface.

Many areas of this unit are wooded. Slope and the rugged terrain are the major limitations for farming, and the soils are highly acidic, have low fertility, and are subject to erosion. Rooting is limited by a firm layer or bedrock. The main limitations for community development are slope, the depth to bedrock, and seasonal wetness.

7. Chenango-Hamlin-Wayland

Dominantly nearly level or gently sloping; deep; somewhat excessively drained, well drained, poorly drained, and very poorly drained; medium-textured soils on valley floors

This unit consists of soils formed in glacial outwash or recent alluvium. Slopes range mainly from 0 to 8 percent but are as much as 35 percent.

This unit makes up about 5 percent of the survey area. Chenango soils make up about 40 percent of the unit, Hamlin soils about 15 percent, Wayland soils about 15 percent, and soils of minor extent about 30 percent.

The Chenango soils are well drained to somewhat excessively drained and formed in sandy and gravelly outwash deposits. The rate of water movement is moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum. These soils are dominantly on nearly level or gently sloping tops of terraces and benches. Some areas are on steep terrace faces, and some areas are fan shaped where small side streams enter main valleys.

The Hamlin soils are well drained and formed in recent alluvial deposits high in silt content. The rate of water movement through the soils is moderate. These soils are near streams and rivers on nearly level flood plains. The Hamlin soils occupy lower positions along the valley floor than the adjacent Chenango soils.

The Wayland soils are poorly drained and very poorly drained and formed in recent alluvium high in silt content. The rate of water movement is moderately slow or slow in the surface layer and slow in the subsoil and substratum. A prolonged high water table is near the soil surface in winter and spring. These soils are nearly level and occupy depressional and low-lying areas on flood plains.

The main soils of minor extent are Teel, Unadilla, Scio, and Castile soils. Moderately well drained and somewhat poorly drained Teel soils are on flood plains adjacent to the Hamlin and Wayland soils. Well drained Unadilla soils and moderately well drained Scio soils have a high silt content and are on terraces that are rarely flooded. Moderately well drained Castile soils are on low, gravelly terraces and in depressional areas along lower valley sides.

Most areas of this unit are used for cultivated crops on dairy farms. A few areas, mostly of Wayland soils, are in woodland. Some areas of the Chenango soils are in community development.

Flooding is the main limitation of this unit for farming and community development. In some areas it delays planting or causes streambank erosion and scouring.

8. Howard-Valois-Teel

Dominantly nearly level to sloping, deep, somewhat excessively drained to somewhat poorly drained, medium-textured soils on valley floors and lower valley sides

This unit consists of soils that formed in glacial outwash, glacial till, or recent alluvium (fig. 4). It is mainly in the Chenango River Valley. Slopes mainly range from 0 to 15 percent but are as much as 50 percent.

The unit makes up about 7 percent of the survey area. Howard soils make up about 25 percent of the unit, Valois soils about 20 percent, Teel soils about 15 percent, and soils of minor extent about 40 percent.

The Howard soils are well drained to somewhat excessively drained and formed in sand and gravel deposits along valley floors. The rate of water movement through the soils is moderate or moderately rapid in the surface layer and subsoil and very rapid in the substratum. These soils are dominantly on nearly level to sloping terraces and benches. Some areas are on steep terrace faces.

The Valois soils are well drained and formed in loamy glacial till. The rate of water movement through the soils is moderate in the surface layer and subsoil and moderate or moderately rapid in the substratum. The soils are dominantly on gently sloping or sloping lower valley sides just above the valley floor.

The Teel soils are moderately well drained and somewhat poorly drained and formed in recent alluvial deposits that have a high silt content. The rate of water movement through the soils is moderate. These soils are on nearly level flood plains along streams and rivers. A seasonal high water table is in the subsoil during the spring and other periods of high stream flow.

The main soils of minor extent are Atherton, Chenango, Trestle, Phelps, Unadilla, Scio, and Wayland soils. Poorly drained and very poorly drained Atherton soils are in depressional areas on terraces. Somewhat excessively drained and well drained Chenango soils are on alluvial fans and valley terraces. Somewhat excessively drained and well drained Trestle soils are adjacent to high-gradient tributaries. Moderately well drained Phelps soils are in moderately low areas on terraces. Well drained Unadilla soils and moderately well drained Scio soils are on valley terraces. Poorly drained and very

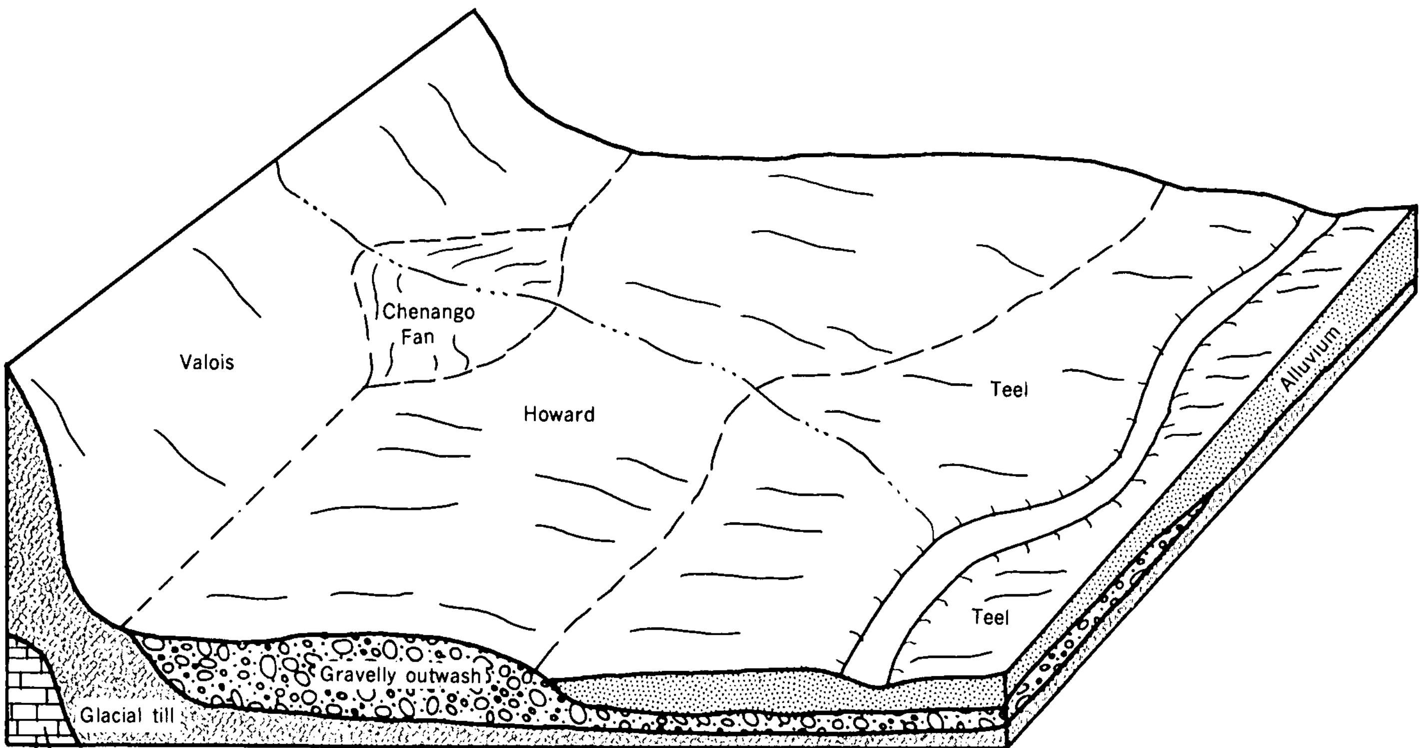


Figure 4.—Typical pattern of soils and underlying material in the Howard-Valois-Teel map unit.

poorly drained Wayland soils are in slackwater areas and other low areas on flood plains adjacent to Teel soils.

Most areas of this unit are used for community development and farming. This unit is well suited to crops on dairy farms. Periodic flooding of the Teel soils in the spring sometimes delays planting and is a major limitation for community development.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Mardin channery silt loam, 3 to 8 percent slopes, is one of several phases in the Mardin series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Bath-Valois gravelly silt loams, 3 to 8 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Lordstown and Oquaga channery silt loams, 15 to 35 percent slopes, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, quarry, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

Ad—Alden silt loam. This soil is deep, nearly level, and very poorly drained. It is on smooth upland flats, in shallow depressions, and along drainageways. Slopes are less than 1 percent. The areas are oval and range from 5 to 25 acres.

Typically, the surface layer is very dark grayish brown silt loam 5 inches thick. The subsoil is mottled, gray and grayish brown silt loam 35 inches thick. The substratum is mottled, grayish brown flaggy silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of poorly drained and very poorly drained Canandaigua soils that have a high silt content and areas of poorly drained and very poorly drained Chippewa soils that have a firm and brittle subsoil. Also included are soils in depressions that have a mucky surface layer and soils in which bedrock is at a depth of less than 60 inches. The areas of included soils make up about 15 percent of this map unit and are as much as 3 acres each.

The seasonal high water table in this Alden soil is between the surface and a depth of 1/2 foot for pro-

longed periods, and water is ponded on the surface of some areas in early spring. The rate of water movement through the soil is moderate in the surface layer, moderately slow in the subsoil, and slow to moderately slow in the substratum. Available water capacity is high. Runoff is very slow. The reaction of the surface layer is strongly acid to neutral.

Much of the acreage of this soil is in woodland. Some areas are in pasture, and a few are used for recreation.

Drained areas of this soil are suited to most crops grown in the county. However, locating adequate outlets for drainage systems is difficult in most areas. Using cover crops and conservation tillage and using crop residue on and in the soil are management practices that maintain organic matter content and promote good tilth.

Unless it is at least partially drained, the soil is poorly suited to pasture. Deferred grazing during wet periods and rotational grazing help to maintain desirable pasture plant species.

The potential productivity for trees on this soil is low. The seasonal high water table restricts rooting, causes a high rate of seedling mortality, and limits the use of equipment.

The water on the surface and the seasonal high water table are the major limitations of the soil for community development.

The capability subclass is IVw.

ArB—Arkport fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is on small mounds, terraces, and benches above the flood plain. The areas are oblong or irregularly shaped and range from 3 to 35 acres.

Typically, the surface layer is dark brown fine sandy loam about 9 inches thick. The subsoil is 33 inches thick. The upper 7 inches of the subsoil is brown fine sandy loam. The lower 26 inches is light brown and brown loamy fine sand and 2-inch-thick bands of dark brown and brown fine sandy loam. The substratum is dark brown fine sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of Unadilla soils that have a high silt content and Riverhead soils that have a high gravel content in the substratum. Also included are areas that are not so well drained as this Arkport soil and a few areas with slopes of as much as 15 percent. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Arkport soil is at a depth of more than 6 feet. The rate of water movement through this soil is moderately rapid. Available water capacity is moderate. Runoff is medium. The reaction of the surface layer is very strongly acid to neutral.

Most of the acreage of this soil is used for cultivated crops and pasture. Some areas are used for community development or woodland.

This soil is well suited to most crops grown in the county. Using cover crops and crop residue helps to improve organic matter content and soil tilth, which in turn improves soil moisture-holding capacity. Those practices and contour tillage or strip tillage help to control erosion.

This soil is well suited to pasture. Restricting grazing during droughty periods helps to maintain desirable pasture plant species.

The potential productivity for trees on this soil is high. Machine planting of seedlings is practical in large areas.

This soil has few limitations for most types of community development uses, but slope is a limitation for the development of playgrounds and parking lots.

The capability subclass is IIe.

AsB—Arnot channery silt loam, 3 to 8 percent slopes. This soil is shallow, gently sloping, and somewhat excessively drained and well drained. It is on high hilltops and ridges on uplands. The areas are long and narrow or oval and range from 5 to 20 acres.

Typically, the surface layer is very dark grayish brown channery silt loam about 6 inches thick. The subsoil is dark brown very channery silt loam 10 inches thick. Bedrock is at a depth of 16 inches.

Included with this soil in mapping are areas of shallow, somewhat poorly drained and poorly drained Tuller soils and moderately deep, somewhat poorly drained and poorly drained Greene soils. Also included are small quarries and a few rock outcrops. The included areas make up about 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Arnot soil is at a depth of more than 6 feet. The rate of water movement through the soil is moderate. Available water capacity is low or very low. Runoff is medium. Bedrock is at a depth of 10 to 20 inches. In unlimed areas the surface layer is extremely acid to medium acid.

Most of the acreage of this soil is in woodland. Some areas are used for pasture or hay.

This soil is poorly suited to most crops grown in the county and is generally suited only to shallow-rooted crops that withstand extended periods of droughtiness. The depth to bedrock, erosion, and droughtiness are the main limitations for crop production. Rock fragments in the soil and a few rock outcrops on the surface limit the use of tillage equipment.

This soil is poorly suited to pasture. The major limitation is droughtiness. Overgrazing causes a loss of desirable forage plants. During the spring, this soil has fair suitability for properly managed pasture.

The potential productivity for trees on this soil is moderate. The rate of seedling mortality is high, and uprooting of trees during windy periods is a hazard.

Depth to bedrock is the main limitation of the soil for community development.

The capability subclass is IIIe.

AsC—Arnot channery silt loam, 8 to 15 percent slopes. This soil is shallow, sloping, and somewhat excessively drained and well drained. It is on hillsides and hilltops on uplands. The areas are long and narrow or oval and range from 5 to 20 acres.

Typically, the surface layer is very dark grayish brown channery silt loam about 6 inches thick. The subsoil is dark brown very channery silt loam 10 inches thick. Bedrock is at a depth of 16 inches.

Included with this soil in mapping are areas of shallow, somewhat poorly drained and poorly drained Tuller soils and moderately deep, somewhat poorly drained or poorly drained Greene soils. In a few places rock outcrops are at the surface. The included areas make up about 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Arnot soil is at a depth of more than 6 feet. The rate of water movement through the soil is moderate. Available water capacity is low or very low. Runoff is rapid. Bedrock is at a depth of 10 to 20 inches. In unlimed areas the surface layer is extremely acid to medium acid.

Most of the acreage of this soil is in woodland. Some areas are used for pasture, and a few are used for hay.

This soil is poorly suited to most crops grown in the county and is generally suited only to shallow-rooted crops that withstand extended periods of droughtiness. The depth to bedrock, erosion, and droughtiness are the main limitations for crop production. Rock fragments in the soil and a few rock outcrops on the surface limit the use of tillage equipment.

This soil is poorly suited to pasture. The major limitation is droughtiness. Overgrazing causes a loss of desirable forage plants. During the spring, this soil has fair suitability for properly managed pasture.

The potential productivity for trees on this soil is moderate. The rate of seeding mortality is high, and uprooting of trees during windy periods is a hazard.

The depth to bedrock and slope are the main limitation of this soil for community development.

The capability subclass is IVe.

At—Atherton silt loam. This soil is deep, nearly level, and poorly drained and very poorly drained. It is on broad or depressional areas in valleys above the flood plain. Slopes range from 0 to 3 percent. The areas are oval and range from 3 to 20 acres.

Typically, the surface layer is very dark gray silt loam about 8 inches thick. The subsoil is firm and mottled and is 31 inches thick. The upper 18 inches of the subsoil is grayish brown silt loam, and the lower 13 inches is dark brown gravelly loam. The substratum is mottled, dark brown very gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Canandaigua and Alden soils. The areas of included soils make up about 10 percent of this unit and are as much as 3 acres each.

This Atherton soil has a seasonal high water table between the surface and a depth of 1/2 foot. The rate of water movement is moderate in the surface layer and subsoil and moderate to moderately rapid in the substratum. Runoff is very slow. Available water capacity is moderate to high. In unlimed areas reaction of the surface layer is strongly acid to neutral.

Much of the acreage of this soil is used for unimproved pasture. A few areas are used for recreation.

The seasonal high water table makes this soil poorly suited to most crops grown in the county. Drainage improves the suitability of this soil for many crops, but outlets for subsurface drains are difficult to locate because of the low position of the soil in the landscape. Using cover crops and sod crops in the cropping system helps to maintain tilth in drained and cultivated areas.

This soil is moderately suited to pasture if the soil is partially drained. The prevention of overgrazing and grazing when the soil is wet is the major concern of pasture management. Grazing when the soil is wet compacts the surface layer, resulting in reduced plant growth.

The potential productivity for trees on this soil is moderate. The seasonal high water table limits the use of equipment, restricts rooting, and causes a high rate of seedling mortality.

The seasonal high water table and potential frost action are the major limitations of this soil for most types of community development.

The capability subclass is IVw.

BaB—Bath channery silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is on convex areas on uplands. The areas are oval and range from 10 to 30 acres.

Typically, the surface layer is dark brown channery silt loam about 11 inches thick. The subsoil is 41 inches thick. The upper 4 inches of the subsoil is yellowish brown channery silt loam. The middle 14 inches is light olive brown and grayish brown channery loam. The lower 23 inches is a firm and brittle layer of mottled, brown very channery loam. The substratum is firm, light olive brown very channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of moderately well drained Mardin soils, somewhat poorly drained Volusia soils, and poorly drained to very poorly drained Chippewa soils. Also included are Lordstown soils where bedrock is at a depth of 20 to 40 inches and areas with bedrock at a depth of 40 to 60 inches. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

This Bath soil has a seasonal high water table perched at a depth of 2 to 2-1/2 feet during early spring. The rate of water movement through the soil is moderate above the firm layers and slow or very slow in the firm layers. Available water capacity is moderate. Runoff is

medium. In unlimed areas reaction of the surface layer is very strongly acid to medium acid.

Most of the acreage of this soil is used for field crops and pasture. Some areas are in woodland.

This soil is suited to most crops grown in the county. In places, rock fragments in the soil interfere with cultivation, planting, and harvesting. The firm layers in the soil limit the suitability for deep-rooted crops.

This soil is suitable for pasture. Overgrazing, especially during dry periods, causes a loss of forage plants and increases the hazard of erosion.

The potential productivity for trees on this soil is moderately high. Planting seedlings when the soil is moist in the spring increases the survival rate.

The slow rate of water movement in the lower part of the soil, a moderate frost-action potential, and the seasonal high water table are the major limitations of the soil as a site for homes, roads, and septic systems.

The capability subclass is IIe.

BaC—Bath channery silt loam, 8 to 15 percent slopes. This soil is deep, sloping, and well drained. It is on hillsides on uplands. The areas are oblong and range from 5 to 50 acres.

Typically, the surface layer is dark brown channery silt loam about 11 inches thick. The subsoil is 41 inches thick. The upper 4 inches of the subsoil is yellowish brown channery silt loam. The middle 14 inches is light olive brown and grayish brown channery loam. The lower 23 inches is a firm and brittle layer of mottled, brown very channery loam. The substratum is firm, light olive brown very channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Mardin, Volusia, Chippewa, Lordstown, and Arnot soils. Also included are areas where bedrock is at a depth of 40 to 60 inches. The included areas make up about 15 percent of this unit and are as much as 3 acres each.

This Bath soil has a seasonal high water table perched at a depth of 2 to 2-1/2 feet during early spring. The rate of water movement through the soil is moderate above the firm layers and slow or very slow in the firm layers. Available water capacity is moderate. Runoff is medium to rapid. In unlimed areas reaction of the surface layer is very strongly acid to medium acid.

Most of the acreage of this soil is used for field crops and pasture. Some areas are in woodland.

This soil is suited to most crops grown in the county. Erosion is a moderate to severe hazard that can be controlled by cross-slope tillage, conservation tillage, and the use of cover crops. Rock fragments in the soil interfere with cultivation, and the firm layers in the soil limit the suitability for deep-rooted crops.

This soil is suitable for pasture. Overgrazing, especially during dry periods, causes a loss of forage plants and increases the hazard of erosion.

The potential productivity for trees on this soil is moderately high. Planting seedlings when the soil is moist in the spring increases the survival rate.

The slow rate of water movement through the lower part of the soil, the seasonal high water table, a frost-action potential, and slope are the main limitations of the soil as a site for roads, homes, and septic systems.

The capability subclass is IIIe.

BaD—Bath channery silt loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is on side slopes of upland hills and on the sides of ridges. The areas are oblong and range from 5 to 30 acres.

Typically, the surface layer is dark brown channery silt loam about 11 inches thick. The subsoil is 41 inches thick. The upper 4 inches of the subsoil is yellowish brown channery silt loam. The middle 14 inches is light olive brown and grayish brown channery loam. The lower 23 inches is a firm and brittle layer of mottled, brown very channery loam. The substratum is firm, light olive brown very channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of the Mardin, Lordstown, and Arnot soils. Also included are areas where bedrock is at a depth of 40 to 60 inches. The included areas make up about 15 percent of this unit and are as much as 3 acres each.

This Bath soil has a seasonal high water table perched at a depth of 2 to 2-1/2 feet during early spring. The rate of water movement through the soil is moderate above the firm layers and slow or very slow in the firm layers. Available water capacity is moderate. Runoff is rapid. In unlimed areas reaction of the surface layer is very strongly acid to medium acid.

Most of the acreage of this soil is in pasture or woodland.

This soil is suited to most crops grown in the county. Slope and a severe erosion hazard are major limitations, however, and the rock fragments in the soil hinder tillage.

This soil is suitable for pasture. Overgrazing, especially during dry periods, causes a loss of forage plants and increases the hazard of erosion. Slope is a limitation for pasture renovation.

The potential productivity for trees on this soil is moderately high. Slope limits equipment use. Planting seedlings when the soil is moist in the spring helps increase the survival rate.

Slope and the slow rate of water movement in the lower part of the soil are major limitations of the soil for community development.

The capability subclass is IVe.

BvB—Bath-Valois gravelly silt loams, undulating. This unit consists of deep, well drained soils on convex, irregularly sloping areas along lower valley sides. Slopes

range from 3 to 8 percent. The areas are long and narrow or oval and range from 15 to 40 acres. They consist of about 50 percent Bath soils, 40 percent Valois soils, and 10 percent other soils. The soils are mapped together because they are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Bath soils is dark brown channery silt loam about 11 inches thick. The subsoil is 41 inches thick. The upper 4 inches of the subsoil is yellowish brown channery silt loam. The middle 14 inches is light olive brown and grayish brown channery loam. The lower 23 inches is a firm and brittle layer of mottled, brown very channery loam. The substratum is firm, light olive brown very channery silt loam to a depth of 60 inches or more.

Typically, the Valois soils have a surface layer of dark brown gravelly silt loam about 9 inches thick. The subsurface layer is grayish brown gravelly silt loam 5 inches thick. The subsoil is yellowish brown gravelly silt loam 26 inches thick. The substratum is dark yellowish brown very gravelly sandy loam to a depth of 60 inches or more.

Included with this unit in mapping are areas of Mardin, Volusia, Arnot, Lordstown, and Chenango soils. Some areas have bedrock at a depth of 40 to 60 inches. The included areas are as much as 3 acres each.

The Bath soils in this unit have a seasonal high water table at a depth of 2 to 2-1/2 feet during early spring. The rate of water movement through the Bath soils is moderate above the firm layers and slow or very slow in the firm layers. Available water capacity is moderate. Runoff is medium. In unlimed areas reaction of the surface layer is very strongly acid to medium acid.

The seasonal high water table in these Valois soils is at a depth of more than 6 feet. The rate of water movement through the soil is moderate in the upper layers and moderate or moderately rapid in the substratum. Available water capacity is moderate. Runoff is medium. In unlimed areas reaction of the surface layer is very strongly acid to strongly acid.

Most of the acreage of this unit is used for crops or pasture.

The soils in this unit are well suited to most crops grown in the county. The use of cover crops, conservation tillage, and the use of crop residue help to control erosion. Rock fragments in the soils interfere with cultivation, but generally these soils have good tilth.

These soils are suited to pasture. Restricting grazing during dry periods helps to maintain desirable forage plants.

The potential productivity for trees on these soils is moderately high. Planting seedlings in the spring when the soils are moist helps to increase the survival rate.

Slow water movement through the firm layers in the Bath soils is a limitation of the unit as a site for septic tank absorption fields. The moderately rapid rate of water movement through the substratum in the Valois soils causes a hazard of ground-water contamination in areas used as sites for septic systems.

The capability subclass is IIe.

BvC—Bath-Valois gravelly silt loams, rolling. This unit consists of deep, well drained soils on foot slopes along valley sides. Slopes range from 8 to 15 percent. The areas are long and narrow or oval and range from 15 to 40 acres. They consist of about 50 percent Bath soils, 40 percent Valois soils, and 10 percent other soils. These soils are mapped together because they are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Bath soils is dark brown channery silt loam about 11 inches thick. The subsoil is 41 inches thick. The upper 4 inches of the subsoil is yellowish brown channery silt loam. The middle 14 inches is light olive brown and grayish brown channery loam. The lower 23 inches is a firm and brittle layer of mottled, brown very channery loam. The substratum is firm, light olive brown very channery silt loam to a depth of 60 inches or more.

Typically, the Valois soils have a surface layer of dark brown gravelly silt loam about 9 inches thick. The subsurface layer is grayish brown gravelly silt loam 5 inches thick. The subsoil is yellowish brown gravelly silt loam 26 inches thick. The substratum is dark yellowish brown very gravelly sandy loam to a depth of 60 inches or more.

Included with this unit in mapping are areas of Mardin, Volusia, Arnot, and Lordstown soils. Some areas have bedrock at a depth of 40 to 60 inches. The included areas are as much as 3 acres each.

The Bath soils in this unit have a seasonal high water table at a depth of 2 to 2-1/2 feet during early spring. The rate of water movement through the Bath soils is moderate above the firm layers and slow or very slow in the firm layers. Available water capacity is moderate. Runoff is medium to rapid. In unlimed areas reaction of the surface layer is very strongly acid to medium acid.

The seasonal high water table in these Valois soils is at a depth of more than 6 feet. The rate of water movement through the soil is moderate in the upper layers and moderate or moderately rapid in the substratum. Available water capacity is moderate. Runoff is medium to rapid. In unlimed areas reaction of the surface layer is very strongly acid to strongly acid.

Most of the acreage of this unit is used for crops or pasture. Some areas are in woodland.

The soils in this unit are suited to most of the crops grown in the county. Using cover crops, contour tillage, and crop residue help to control a moderate erosion hazard. Rock fragments in the soil interfere with cultivation, but generally these soils are not difficult to till.

These soils are suited to pasture. Restricting grazing or using rotational grazing during dry periods helps to maintain desirable forage plants.

The potential productivity for trees on these soils is moderately high. Planting seedlings in the spring when the soils are moist helps to increase the rate of survival.

Slope and the slow water movement through the firm layers in the Bath soils is a limitation of the unit as a site for septic tank absorption fields. The moderately rapid rate of water movement through the substratum in the Valois soils causes a hazard of ground-water contamination in areas used as sites for septic systems.

The capability subclass is IIIe.

BvD—Bath-Valois gravelly silt loams, hilly. This unit consists of deep, well drained soils on the lower sides of valleys. Slopes range from 15 to 30 percent. The areas are long and narrow or oval and range from 15 to 45 acres. They consist of about 50 percent Bath soils, 40 percent Valois soils, and 10 percent other soils. These soils are so intermingled it was not practical to map them separately.

Typically, the surface layer of the Bath soils is dark brown channery silt loam about 11 inches thick. The subsoil is 41 inches thick. The upper 4 inches of the subsoil is yellowish brown channery silt loam. The middle 14 inches is light olive brown and grayish brown channery loam. The lower 23 inches is a firm and brittle layer of mottled, brown very channery loam. The substratum is firm, light olive brown very channery silt loam to a depth of 60 inches or more.

Typically, the Valois soils have a surface layer of dark brown gravelly silt loam about 9 inches thick. The subsurface layer is grayish brown gravelly silt loam 5 inches thick. The subsoil is yellowish brown gravelly silt loam 26 inches thick. The substratum is dark yellowish brown very gravelly sandy loam to a depth of 60 inches or more.

Included with this unit in mapping are areas of Mardin, Arnot, and Lordstown soils. Some areas have bedrock at a depth of 40 to 60 inches, and some others are steep. The included areas are as much as 3 acres each.

The Bath soils in this unit have a seasonal high water table at a depth of 2 to 2-1/2 feet during early spring. The rate of water movement through the Bath soils is moderate above the firm layers and slow or very slow in the firm layers. Available water capacity is moderate. Runoff is rapid. In unlimed areas reaction of the surface layer is very strongly acid to medium acid.

The seasonal high water table in these Valois soils is at a depth of more than 6 feet. The rate of water movement through the soil is moderate in the upper layers and moderate or moderately rapid in the substratum. Available water capacity is moderate. Runoff is rapid. In unlimed areas reaction of the surface layer is very strongly acid to strongly acid.

Much of the acreage of this unit is in pasture or woodland.

The soils in this unit are suited to most crops grown in the county. Slope is a major limitation, and erosion is a severe hazard. Cover crops, conservation tillage, and the use of crop residue are practices needed to control erosion in cultivated areas.

These soils are suited to pasture, but reseeding is difficult because of the moderately steep and irregular slopes.

The potential productivity for trees on these soils is moderately high. Slope limits the use of equipment. Planting in the spring when soils are moist helps to improve seedling survival.

Slope and the slow water movement through the firm layers in the Bath soils are limitations of the unit as a site for septic tank absorption fields. The moderately rapid rate of water movement through the substratum in the Valois soils causes a hazard of ground-water contamination in areas used as a site for septic systems.

The capability subclass is IVe.

Ca—Canandaigua silt loam. This soil is deep, nearly level, and poorly drained and very poorly drained. It is in shallow depressions and drainageways on uplands. Slopes range from 0 to 3 percent but are mostly less than 1 percent. The areas are oval and range from 3 to 20 acres.

Typically, the surface layer of this soil is very dark grayish brown silt loam about 7 inches thick. The subsoil is mottled, gray silt loam 20 inches thick. The substratum is gray and extends to a depth of 60 inches or more. The upper part of the substratum is mottled silt loam, and the lower part is very fine sandy loam.

Included with this soil in mapping are areas of somewhat poorly drained and poorly drained Raynham soils and poorly drained and very poorly drained Atherton soils. Also included are areas of very poorly drained and poorly drained Wayland soils. Included areas make up as much as 10 percent of this unit and are as much as 3 acres each.

This Canandaigua soil usually has water on the surface from winter to spring. The rate of water movement through the soil is moderate in the surface layer and moderately slow in the subsoil and substratum. Available water capacity is high. Runoff is very slow. Reaction of the surface layer is medium acid to mildly alkaline.

Much of the acreage of this soil is in woodland. Some areas are used as wetland wildlife habitat.

Drained areas of this soil are suited to most crops grown in the county, but a lack of outlets makes drainage difficult. Cover crops, conservation tillage, and the use of crop residue are practices that help maintain good tilth in cultivated areas.

This soil is poorly suited to pasture. Overgrazing and grazing when the soil is wet are the major concerns of pasture management. Overgrazing causes a loss of desirable grasses; grazing when the soil is wet causes soil compaction. The use of proper stocking rates, rotational grazing, and restricted grazing during wet periods are the main management needs.

The potential productivity for trees on this soil is moderate. The water on the surface restricts the use of equipment and causes a high seedling mortality rate. Uprooting of trees is a hazard caused by the restricted rooting depth.

Wetness, a high frost-action potential, and the moderately slow rate of water movement through the subsoil are the major limitations of the soil for community development.

The capability subclass is IVw.

CbB—Canaseraga silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained to moderately well drained. It is on foot slopes in main valleys. The areas are oblong and range from 3 to 15 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The upper part of the subsoil is yellowish brown and brownish yellow silt loam 16 inches thick. The middle part of the subsoil is a firm layer of grayish brown very fine sandy loam 5 inches thick. The lower part of the subsoil is a firm layer of mottled, light olive brown and grayish brown channery loam 25 inches thick. The substratum is firm, light olive brown channery loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Raynham, Mardin, and Volusia soils. Also included are areas where bedrock is at a depth of less than 60 inches. Included areas make up about 15 percent of this unit and are as much as 3 acres each.

This Canaseraga soil has a seasonal high water table at a depth of 1-1/2 to 4 feet during early spring and other wet periods. The rate of water movement is moderate above the firm layers in the soil and slow or very slow in the firm layers. Available water capacity is moderate. Runoff is medium. In unlimed areas reaction of the surface layer is very strongly acid to medium acid.

Most of the acreage of this soil is used for hay and pasture. Some areas are in woodland.

This soil is suited to most crops grown in the county. The major limitations for cultivated crops are a hazard of erosion and a restricted root zone. Wetness early in spring delays tillage in some years. The practices needed to control erosion in cultivated areas are contour tillage, stripcropping, conservation tillage, and the use of cover crops.

This soil is suitable for pasture. Overgrazing and grazing when the soil is wet are the major concerns of pasture management on this soil. Overgrazing causes a loss of forage plants and increases the hazard of erosion. Grazing when the soil is wet causes soil compaction and restricted plant growth.

The potential productivity for trees on this soil is high. Planting seedlings when the soil is moist in early spring increases the survival rate.

Seasonal wetness, a frost-action potential, and slow or very slow permeability in the firm layers are the major limitations of the soil for community development.

The capability subclass is IIe.

CbC—Canaseraga silt loam, 8 to 15 percent slopes. This soil is deep, sloping, and moderately well drained and well drained. It is on foot slopes in main valleys. The areas are oblong and range from 3 to 15 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The upper part of the subsoil is yellowish brown and brownish yellow silt loam 16 inches thick. The middle part of the subsoil is a firm layer of grayish brown very fine sandy loam 5 inches thick. The lower part of the subsoil is a firm layer of mottled, light olive brown and grayish brown channery loam 25 inches thick. The substratum is firm, light olive brown channery loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Raynham, Mardin, and Volusia soils. Also included are areas where bedrock is at a depth of less than 60 inches. Included areas make up about 15 percent of this unit and are as much as 3 acres each.

This Canaseraga soil has a seasonal high water table at a depth of 1-1/2 to 4 feet during early spring and other wet periods. The rate of water movement is moderate above the firm layers in the soil and slow or very slow in the firm layers. Available water capacity is moderate. Runoff is medium to rapid. In unlimed areas reaction of the surface layer is very strongly acid to medium acid.

Most of the acreage of this soil is used for hay and pasture or is in woodland.

This soil is suited to most crops grown in the county. The major limitations for cultivated crops are a hazard of erosion and a restricted root zone. Wetness in early spring delays tillage in some years. The practices needed to control erosion in cultivated areas are contour tillage, stripcropping, conservation tillage, and the use of cover crops.

This soil is suitable for pasture. Overgrazing and grazing when the soil is wet are the major concerns of pasture management on this soil. Overgrazing causes a loss of forage plants and increases the hazard of erosion. Grazing when the soil is wet causes soil compaction and restricted plant growth.

The potential productivity for trees on this soil is high. Planting seedlings when the soil is moist in early spring increases the survival rate.

Seasonal wetness, slow or very slow permeability in the firm layers, slope, and frost-action potential are the main limitations of the soil for most types of community development.

The capability subclass is IIIe.

Cc—Carlisle muck. This soil is deep, level, and very poorly drained. It is in bogs, deep depressions, and along drainageways. Slopes range from 0 to 2 percent. The areas are oval and range from 5 to 25 acres.

Typically, the surface layer is black decomposed organic material about 9 inches thick. The subsurface layers are dark reddish brown decomposed organic material to a depth of 67 inches. The layers below a depth of 67 inches are very dark grayish brown and dark brown decomposed organic material.

Included with this soil in mapping are areas where the organic material is less than 51 inches thick and areas of Atherton, Alden, and Canandaigua soils. A few areas consist of Saprists and Aquents. Included areas make up about 15 percent of this unit and are as much as 3 acres each.

This Carlisle soil has a seasonal high water table between the surface and a depth of 1 foot from September to June. In the spring many areas have water on the surface. The rate of water movement through the soil is moderately slow to moderately rapid. Runoff is very slow. Reaction in the surface layer is very strongly acid to neutral.

Much of the acreage of this soil is wooded. Some areas are used for wildlife ponds.

Drained areas of this soil are well suited to vegetables and truck crops, but drainage outlets are difficult to locate because of the low position of this soil on the landscape. Drained areas of this soil are subject to wind erosion that can be controlled by use of cover crops and windbreaks.

This soil is poorly suited to pasture because of the prolonged wetness. The hoofs of animals readily puncture the soft organic surface layer, and thus desirable seedlings are easily damaged.

The potential productivity for trees on this soil is moderate. The high water table limits the use of equipment and causes a high rate of seedling mortality. It also restricts rooting, causing a hazard of uprooting during windy periods.

The high water table and the instability of the organic material are major limitations of this soil for community development.

The capability subclass is Vw.

CdA—Castile gravelly silt loam, 0 to 3 percent slopes. This soil is deep, nearly level, and moderately well drained. It is on low benches and terraces along valley bottoms. The areas are oval or narrow and range from 3 to 12 acres.

Typically, the surface layer is a dark grayish brown gravelly silt loam about 8 inches thick. The subsoil is brown gravelly and very gravelly silt loam 21 inches thick. The lower part of the subsoil is mottled. The substratum is dark brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are low areas of poorly drained and very poorly drained Atherton soils and somewhat poorly drained Red Hook soils. Included areas make up about 10 percent of this unit and are as much as 3 acres each.

This Castile soil has a seasonal high water table at a depth of 1-1/2 to 2 feet during early spring. The rate of water movement is moderate to moderately rapid in the surface layer, moderately rapid in the subsoil, and rapid or very rapid in the substratum. Runoff is slow. Available water capacity is low. In unlimed areas reaction of the surface layer is very strongly acid to medium acid.

Most of the acreage of this soil is used for cultivated crops, hay, and pasture.

This soil is suited to most crops grown in the county. The seasonal high water table delays early-spring tillage, but later in the growing season droughtiness is a concern. Gravel fragments in the soil interfere with some tillage operations. The use of cover crops and sod crops in the cropping system will help to maintain tilth and increase the organic matter content, which in turn improves the moisture storing capacity of the soil.

This soil is well suited to pasture. Grazing while the soil is wet in the spring causes soil compaction and loss of desirable forage species.

The productivity potential for trees on this soil is moderately high. Planting seedlings in the spring when the soil is moist will help increase the survival rate.

The seasonal high water table is the major limitation of the soil for community development and is a limitation for recreational uses such as picnic areas, camp areas, and trails.

The capability subclass is IIw.

CdB—Castile gravelly silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is on low, undulating benches and terraces in valleys. The areas are oval or narrow and range from 3 to 12 acres.

Typically, the surface layer is dark grayish brown gravelly silt loam about 8 inches thick. The subsoil is brown gravelly and very gravelly silt loam 21 inches thick. The lower part of the subsoil is mottled. The substratum is dark brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are low areas of poorly drained and very poorly drained Atherton soils and somewhat poorly drained Red Hook soils. Included areas make up about 10 percent of this unit and are as much as 3 acres each.

This Castile soil has a seasonal high water table at a depth of 1-1/2 to 2 feet during early spring. The rate of water movement is moderate to moderately rapid in the surface layer, moderately rapid in the subsoil, and rapid or very rapid in the substratum. Runoff is slow. Available water capacity is low. In unlimed areas reaction of the surface layer is very strongly acid to medium acid.

Most of the acreage of this soil is used for cultivated crops, hay, and pasture.

This soil is suited to most crops grown in the county. The seasonal high water table is the main limitation for farming because it delays spring tillage. Gravel in the soil hinders some tillage operations, and droughtiness is a limitation in midsummer, particularly in dry years. Conservation tillage, cross-slope tillage, and the use of cover crops are practices that help to control erosion in cultivated areas.

This soil is well suited to pasture. Grazing while the soil is wet in the spring causes soil compaction and a loss of desirable forage plants.

The productivity potential for trees on this soil is moderately high. Planting seedlings in the spring when the soil is moist will help increase the survival rate.

The seasonal high water table is the main limitation of this soil for most types of community development.

The capability subclass is IIw.

ChA—Chenango gravelly silt loam, 0 to 3 percent slopes. This soil is deep, nearly level, and well drained to somewhat excessively drained. It is on terraces along lower valley sides. The areas are oval and range from 3 to 30 acres.

Typically, the surface layer is dark brown gravelly silt loam about 9 inches thick. The subsoil is dark yellowish brown and brown gravelly silt loam, very gravelly loam, and very gravelly sandy loam and is 25 inches thick. The substratum is dark brown coarse sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are reddish soils in the Norwich, Oxford, and Mount Upton areas. Also included are soils with a surface layer of fine sandy loam. Castile, Red Hook, and Atherton soils are in some low areas and depressions. The included areas make up about 20 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Chenango soil is at a depth of more than 6 feet. The rate of water movement is moderate to moderately rapid in the surface layer and subsoil and rapid in the substratum. Available water capacity is low. Runoff is slow. In unlimed areas reaction of the surface layer is very strongly acid or strongly acid.

Most of the acreage of this soil is used for cultivated crops grown on dairy farms (fig. 5).

This soil is well suited to most crops grown in the county. The low available water capacity, droughtiness, and a high content of gravel in the soil are the main limitations for crops. The gravel hinders tillage for some crops and causes rapid wear of equipment. Using cover crops and crop residue helps to maintain tilth and conserve moisture by increasing organic matter content.

The soil is suitable for pasture. Droughtiness is the main limitation. Overgrazing during dry periods causes a loss of desirable forage plants and increases erosion. Rotational grazing and maintaining proper stocking rates are the main pasture management practices and are especially needed during dry periods.

The potential productivity for trees on this soil is high. Planting in the spring when the soil is moist increases the survival rate.

This soil has few limitations for most types of community development. The rapid rate of movement of water through the substratum causes a hazard of ground-water contamination in areas used as sites for septic systems.

The capability subclass is IIs.

ChB—Chenango gravelly silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained to somewhat excessively drained. It is on undulating terraces along lower valley sides and on benches. The areas are oval and range from 5 to 35 acres.

Typically, the surface layer is dark brown gravelly silt loam about 9 inches thick. The subsoil is dark yellowish brown and brown gravelly silt loam, very gravelly loam, and very gravelly sandy loam and is 25 inches thick. The substratum is dark brown coarse sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are reddish soils in the Norwich, Oxford, and Mount Upton areas. Also included are soils with a surface layer of fine sandy loam. Castile, Red Hook, and Atherton soils are in some low areas and depressions. The included areas make up about 20 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Chenango soil is at a depth of more than 6 feet. The rate of water movement is moderate to moderately rapid in the surface layer and subsoil and rapid in the substratum. Available water capacity is low. Runoff is slow. In unlimed areas reaction of the surface layer is very strongly acid or strongly acid.

Most of the acreage of this soil is used for cultivated crops.

This soil is suited to most crops grown in the county. Low available water capacity, droughtiness, and a high content of gravel in the soil are the main limitations for crops. The gravel hinders tillage for some crops and causes rapid wear of machinery. Erosion is a minor hazard that can be controlled by use of cross-slope tillage, cover crops, and conservation tillage. Using crop residue and sod crops in the cropping sequence will help to maintain tilth and organic matter content, thus improving the moisture storing capacity of the soil.

The soil is suitable for pasture. Droughtiness is the main limitation. Overgrazing during dry periods causes a loss of desirable forage plants and increased erosion. Rotational grazing and maintaining proper stocking rates are the main pasture management practices.

The potential productivity for trees on this soil is high. Planting in the spring when the soil is moist increases the survival rate.

Figure 5.—Corn on an area of Chenango gravelly silt loam, 0 to 3 percent slopes.

This soil has few limitations for most types of community development. The rapid rate of movement of water through the substratum causes a hazard of ground-water contamination in areas used as sites for septic systems.

The capability subclass is IIs.

ChC—Chenango gravelly silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and well drained to somewhat excessively drained. It is on rolling areas along lower valley sides. The areas are oblong and range from 5 to 45 acres.

Typically, the surface layer is dark brown gravelly silt loam about 9 inches thick. The subsoil is dark yellowish brown and brown gravelly silt loam, very gravelly loam, and very gravelly sandy loam and is 25 inches thick. The substratum is dark brown coarse sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are reddish soils in the Norwich, Oxford, and Mount Upton areas. Also included are soils with a surface layer of fine sandy loam. Castile, Red Hook, and Atherton soils are in some low areas and depressions. The included areas make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Chenango soil is at a depth of more than 6 feet. The rate of water movement is moderate to moderately rapid in the surface layer and subsoil and rapid in the substratum. Available water capacity is low. Runoff is medium. In unlimed areas reaction of the surface layer is very strongly acid or strongly acid.

Most of the acreage of this soil is used for cultivated crops or hay. Some areas are used for pasture.

This soil is moderately suited to most crops grown in the county. Low available water capacity, droughtiness,

an erosion hazard, and a high content of gravel in the soil are the main limitations. The gravel in the soil hinders the cultivation and harvest of some crops and causes a rapid wear of equipment. Cross-slope tillage, using cover crops, stripcropping where practical, and conservation tillage are practices that will help to control erosion, maintain tilth, and conserve moisture.

The soil is suitable for pasture. Droughtiness is the main limitation. Overgrazing during dry periods causes a loss of desirable forage plants and increases erosion. Rotational grazing and maintaining proper stocking rates are the main pasture management practices and are especially needed during dry periods.

The potential productivity for trees on this soil is high. Planting in the spring when the soil is moist increases the survival rate.

Slope, potential frost action, and the rapid rate of water movement through the substratum are the main limitations of the soil for community development. The rapid movement of water through the substratum causes a hazard of ground-water contamination in areas used as sites for septic systems.

The capability subclass is IIIe.

ChD—Chenango gravelly silt loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained to somewhat excessively drained. It is on short, uneven foot slopes along valley sides and along terraces. The areas are long and narrow or oval and range from 5 to 25 acres.

Typically, the surface layer is dark brown gravelly silt loam about 9 inches thick. The subsoil is dark yellowish brown and brown gravelly silt loam, very gravelly loam, and very gravelly sandy loam and is 25 inches thick. The substratum is dark brown coarse sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are areas of Bath and Lackawanna soils. Also included are areas of reddish soils in the Norwich, Oxford, and Mount Upton areas. The included areas make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Chenango soil is at a depth of more than 6 feet. The rate of water movement is moderate to moderately rapid in the surface layer and subsoil and rapid in the substratum. Available water capacity is low. Runoff is rapid. In unlimed areas reaction of the surface layer is very strongly acid or strongly acid.

Much of the acreage of this soil is in pasture or woodland.

Droughtiness and slope make this soil poorly suited to most crops grown in the county. The slope makes the operation of equipment hazardous and causes a severe erosion hazard. Cross-slope and strip tillage, conservation tillage, and the use of cover crops and sod crops are practices that help to control erosion in cultivated areas.

The soil is suitable for pasture. Droughtiness is the main limitation. Overgrazing during dry periods causes a loss of desirable forage plants and increases erosion. Rotational grazing and maintaining proper stocking rates are the main pasture management practices and are especially needed during dry periods.

The potential productivity of this soil for trees is high. The erosion hazard can be controlled by placing logging trails across the slope. Slope limits the use of equipment. Planting in the spring when the soil is moist helps to increase the rate of survival.

Slope is the major limitation of this soil for community development. The rapid rate of water movement in the substratum causes a hazard of ground-water contamination in areas used as sites for septic systems.

The capability subclass is IVe.

ChE—Chenango gravelly silt loam, 25 to 35 percent slopes. This soil is deep, steep, and well drained and somewhat excessively drained. It is on terraces and bench faces and on sides of ridges along lower valley sides. The areas are long and narrow and range from 5 to 15 acres.

Typically, the surface layer is dark brown gravelly silt loam about 9 inches thick. The subsoil is dark yellowish brown and brown gravelly silt loam, very gravelly loam, and very gravelly sandy loam and is 25 inches thick. The substratum is dark brown coarse sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are areas of Bath and Lackawanna soils. Also included are areas of reddish soils in the Norwich, Oxford, and Mount Upton areas. The included areas make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Chenango soil is at a depth of more than 6 feet. The rate of water movement is moderate to moderately rapid in the surface layer and subsoil and rapid in the substratum. Available water capacity is low. Runoff is rapid to very rapid. In unlimed areas reaction of the surface layer is very strongly acid or strongly acid.

Droughtiness and slope make this soil generally unsuited to most crops grown in the county and make the soil poorly suited to pasture. Reseeding is difficult because of the slope. Restricting grazing during dry periods is essential for maintaining desirable forage plants.

The potential productivity for trees on this soil is high, and most areas are wooded. The erosion hazard can be controlled by placing logging trails across the slope. The slope restricts the operation of woodland harvesting and planting equipment and is the major limitation for most types of community development.

The capability subclass is VIe.

CkA—Chenango channery silt loam, fan, 0 to 3 percent slopes. This soil is deep, nearly level, and well drained to somewhat excessively drained. It is on alluvial

fans that are in outlet areas where narrow side streams enter main valleys. The areas are fan shaped and range from 3 to 30 acres. The small streams that cross this unit cause rare, brief flooding.

Typically, the surface layer is very dark grayish brown channery silt loam about 8 inches thick. The subsoil is dark brown very gravelly silt loam 16 inches thick. The substratum is dark grayish brown very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of Hamlin, Teel, Wayland, Castile, Red Hook, and Atherton soils and Udifluvents and Fluvaquents. Also included are areas where the soil material is red, primarily in the town of Oxford where side streams enter the Chenango Valley and in the towns of Norwich and Guilford where small streams flow into the Unadilla Valley. Included areas make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Chenango soil is at a depth of 3 to 6 feet in early spring. The rate of water movement is moderate to moderately rapid in the surface layer and subsoil and rapid in the substratum. Available water capacity is low. Runoff is slow. In unlimed areas reaction of the surface layer is very strongly acid or strongly acid.

Most of the acreage of this soil is used for cultivated crops, alfalfa-hay, and pasture (fig. 6).

This soil is well suited to most crops grown in the county. The low available water capacity, droughtiness, a high content of rock fragments in the soil, and flooding are the main limitations for farming. The rock fragments interfere with planting, cultivation, and harvesting of some crops and cause rapid wear of equipment. Using

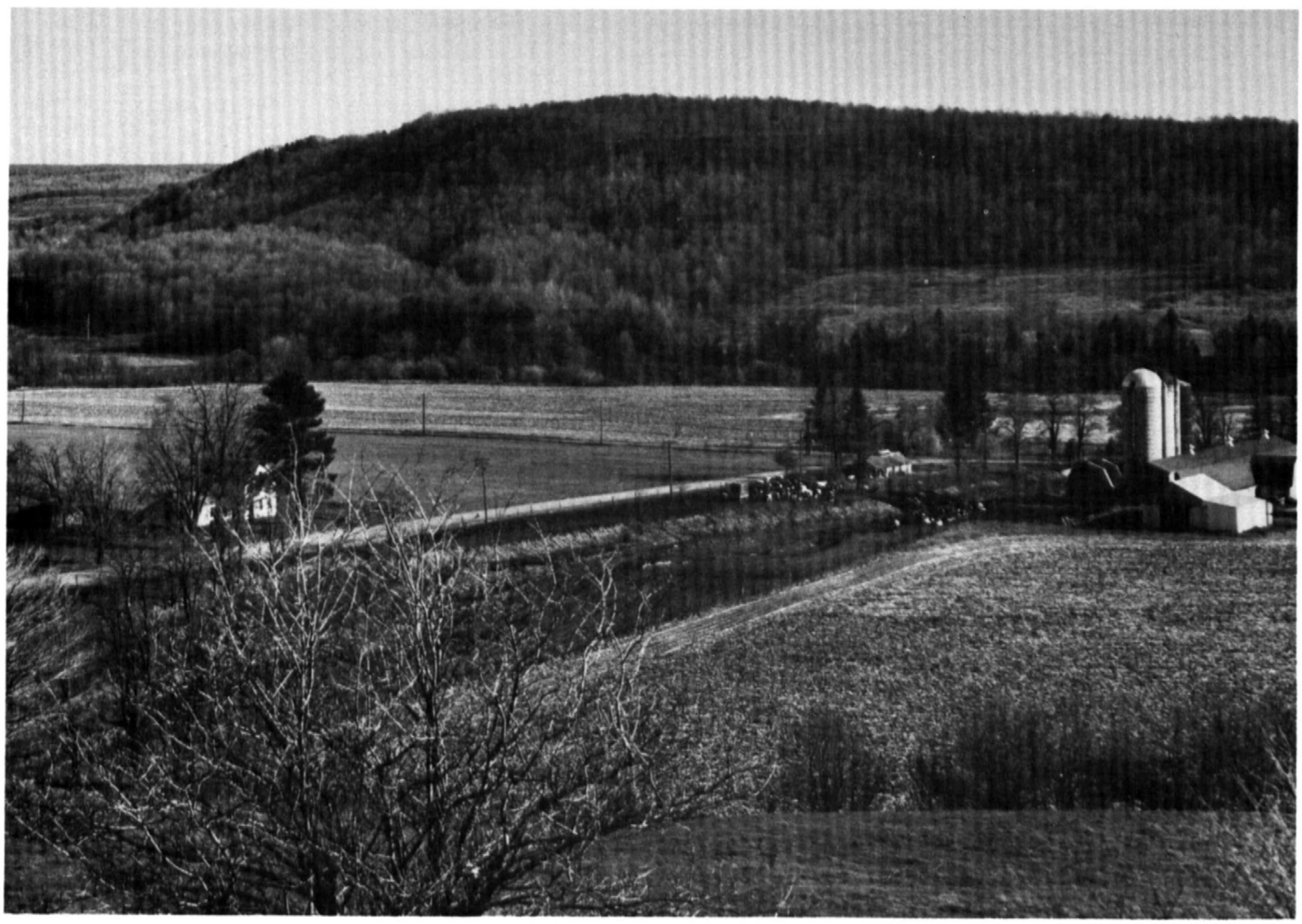


Figure 6.—Chenango channery silt loam, fan, 0 to 3 percent slopes, is in the foreground. The steeper area in the background is Lordstown and Oquaga channery silt loams, 15 to 35 percent slopes.

cover crops and crop residue will help to maintain and improve tilth and organic matter content, which in turn increases the available water capacity.

This soil is well suited to pasture. Overgrazing during dry periods causes a loss of desirable forage plants.

The potential productivity for trees on this soil is high. Planting seedlings in early spring when the soil is moist will help to increase the survival rate.

Flooding is the major limitation of this unit for most types of community development. The edges of the unit are flooded more frequently than the inner parts. The rapid rate of water movement in the substratum causes a hazard of ground-water contamination in areas used as sites for septic systems.

The capability subclass is IIs.

CkB—Chenango channery silt loam, fan, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained to somewhat excessively drained. It is on alluvial fans that are in outlet areas where narrow side streams enter main valleys. The areas are fan shaped and range from 3 to 30 acres. The soil is subject to rare flooding from the small streams that cross this unit.

Typically, the surface layer is very dark grayish brown channery silt loam about 8 inches thick. The subsoil is dark brown very gravelly silt loam 16 inches thick. The substratum is dark grayish brown very gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of Hamlin, Teel, Wayland, Castile, Red Hook, and Atherton soils and Udifluvents and Fluvaquents. Also included are areas where the soil material is red, primarily in the town of Oxford where side streams enter the Chenango Valley and in the towns of Norwich and Guilford where small streams flow into the Unadilla Valley. Included areas make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Chenango soil is at a depth of 3 to 6 feet in early spring. The rate of water movement is moderate to moderately rapid in the surface layer and subsoil and rapid in the substratum. Available water capacity is low. Runoff is slow to medium. In unlimed areas reaction of the surface layer is very strongly acid or strongly acid.

Most of the acreage of this soil is used for cultivated crops, alfalfa-hay, and pasture.

This soil is well suited to most crops grown in the county. The low available water capacity, droughtiness, a high content of rock fragments in the soil, and an erosion hazard are the main limitations for farming. The rock fragments interfere with planting and harvesting. The use of cover crops and crop residue will increase the organic matter content of the soil and improve the moisture capacity and, along with contour tillage and stripcropping, will help to control erosion.

This soil is well suited to pasture. Overgrazing during dry periods causes a loss of desirable forage plants.

The potential productivity for trees on this soil is high. Planting seedlings in early spring when the soil is moist will help to increase the survival rate.

Flooding is the major limitation of this unit for most types of community development. The edges of the unit are flooded more frequently than the inner parts. The rapid rate of water movement in the substratum causes a hazard of ground-water contamination in areas used as sites for septic systems.

The capability subclass is IIs.

Cm—Chippewa and Norwich soils. This unit consists of deep, nearly level, poorly drained to very poorly drained soils at the base of foot slopes, in depressions, and along drainageways. Some areas consist mostly of Chippewa soils, some mostly of Norwich soils, and some of both. The Chippewa and Norwich soils were mapped together because they have no major differences in use and management. The total acreage of the unit consists of about 45 percent Chippewa soils, 40 percent Norwich soils, and 15 percent other soils. Slopes range from 0 to 3 percent. The areas are oblong or long and narrow and range from 3 to 25 acres.

Typically, the Chippewa soils have a surface layer of very dark grayish brown channery silt loam about 5 inches thick. The subsurface layer is mottled, dark grayish brown channery silt loam 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 5 inches of the subsoil is mottled, grayish brown channery silt loam. The lower part is a mottled, firm layer of light brownish gray channery silt loam and dark grayish brown channery loam.

Typically, the Norwich soils have a surface layer of very dark gray silt loam about 9 inches thick. The subsurface layer is mottled, grayish brown channery silt loam 6 inches thick. The subsoil is a firm, mottled layer of brown and dark reddish gray channery silt loam that extends to a depth of 60 inches or more.

Included with these soils in mapping are areas of Volusia, Morris, Alden, and Greene soils. Some areas have bedrock at a depth of 40 to 60 inches. The areas of included soils are as much as 3 acres each.

The seasonal high water table in these Chippewa and Norwich soils is between the surface and a depth of 1/2 foot for prolonged periods from late fall to late spring. The rate of water movement through both soils is moderate above the firm layers and slow or very slow in the firm layers. Available water capacity is low in both soils, and runoff is very slow. In unlimed areas reaction in the surface layer is very strongly acid to slightly acid in the Chippewa soils and strongly acid to slightly acid in the Norwich soils.

Much of the acreage of these soils is wooded. A few areas are used for pasture.

Prolonged wetness and a shallow rooting depth make these soils poorly suited to most crops grown in the county. These soils are difficult to drain because of the

lack of suitable outlets and the slow or very slow rate of water movement through the lower part of the soil.

These soils are moderately suitable for pasture. Overgrazing and pasturing when the soil is wet will result in surface compaction and a loss of desirable forage plants. Pastures can be improved by diverting surface runoff from higher adjacent soils and by use of interceptor drains.

The potential productivity for trees on these soils is low. The seasonal high water table limits the use of equipment, causes a high rate of seedling mortality, and causes a hazard of uprooting.

The seasonal high water table, the slow to very slow rate of water movement in the lower part of the soils, and a frost-action potential are major limitations of this unit for community development.

The capability subclass is IVw.

Cn—Chippewa and Norwich very stony silt loams. This unit consists of deep, nearly level, very poorly drained to poorly drained soils in low areas, along seep spots and drainageways, and in depressions. Some areas consist mostly of Chippewa soils, some mostly of Norwich soils, and some of both. These soils were mapped together because they have no major differences in use and management. The total acreage of the unit consists of about 55 percent Chippewa soils, 35 percent Norwich soils, and 10 percent other soils. Slopes range from 0 to 3 percent. Stones and boulders about 5 to 30 feet apart are on the surface. The areas are irregularly shaped and range from 5 to 25 acres.

Typically, the Chippewa soils have a surface layer of very dark grayish brown channery silt loam about 5 inches thick. The subsurface layer is mottled, dark grayish brown channery silt loam 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 5 inches of the subsoil is mottled, grayish brown channery silt loam. The lower part is a mottled, firm layer of light brownish gray channery silt loam and dark grayish brown channery loam.

Typically, the Norwich soils have a surface layer of very dark gray silt loam about 9 inches thick. The subsurface layer is mottled, grayish brown channery silt loam 6 inches thick. The subsoil is a firm, mottled layer of brown and dark reddish gray channery silt loam that extends to a depth of 60 inches or more.

Included with these soils in mapping are areas of Alden, Tuller, and Greene soils. Some areas have bedrock at a depth of 40 to 60 inches, and a few areas do not have stones on the surface. The areas of included soils are as much as 3 acres each.

The seasonal high water table in these Chippewa and Norwich soils is between the surface and a depth of a 1/2 foot for prolonged periods from late fall to late spring. The rate of water movement through both soils is moderate above the firm layers and slow or very slow in the firm layers. Available water capacity is low in both soils, and runoff is very slow. In unlimed areas reaction in the surface layer is very strongly acid to slightly acid in the Chippewa soils and strongly acid to slightly acid in the Norwich soils.

Much of the acreage of these soils is wooded. Some areas are used for wildlife habitat.

The stones on the surface, prolonged wetness, and a shallow rooting depth make these soils generally unsuitable for cultivated crops and poorly suited to pasture. The wetness causes poor-quality pastures, and the stones on the surface hinder reseeding.

The potential productivity for trees on these soils is low. Wetness and the stones on the surface limit the use of equipment and cause a high rate of seedling mortality. Trees are subject to uprooting in windy periods because of the shallow rooting depth.

These soils provide habitat for some types of wildlife, but the seasonal high water table is a major limitation for most types of community development.

The capability subclass is VIIs.

GrB—Greene silt loam, 3 to 8 percent slopes. This soil is gently sloping, moderately deep, and somewhat poorly drained to poorly drained. It is on broad hilltops and long, narrow concave areas on benched side slopes. The areas range from 5 to 25 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is mottled, light brownish gray and grayish brown channery silt loam 13 inches thick. The substratum is a firm layer of mottled, grayish brown channery loam 12 inches thick. Fractured siltstone and sandstone bedrock is at a depth of 34 inches.

Included with this soil in mapping are areas of Arnot, Tuller, Norwich, and Chippewa soils. Some areas are nearly level. The included areas make up about 20 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Greene soil is at a depth of 1/2 foot to 1 foot from late fall to late spring. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through this soil is moderate in the surface layer and moderately slow and slow in the subsoil and substratum. Available water capacity is moderate. Runoff is slow. In unlimed areas reaction of the surface layer is very strongly acid or strongly acid.

Most areas of this soil are wooded or in pasture. Some areas are in corn or hay.

Drained areas of this soil are moderately suited to most crops grown in the county. Subsurface drains are often difficult to install, however, because of the underlying bedrock. Erosion is a hazard. Conservation tillage and using cover crops and crop residue will help to maintain tilth and, with cross-slope tillage and stripcropping, will help to control erosion.

This soil is suitable for pasture, but grazing when the soil is wet causes compaction of the surface layer and loss of desirable forage plants. Partial drainage or use of

drains that intercept runoff from adjacent soils will improve most areas of this soil for pasture.

The potential productivity for trees on this soil is low. The seasonal high water table limits the use of equipment, causes a high seedling mortality rate, and restricts rooting, which causes a hazard of uprooting during windy periods.

The seasonal high water table and the depth to bedrock are the major limitations of this soil for community and recreational development.

The capability subclass is IIIw.

GrC—Greene silt loam, 8 to 15 percent slopes. This soil is sloping, moderately deep, and somewhat poorly drained to poorly drained. It is on the sides of ridges and on benched side slopes. The areas range from 3 to 30 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is mottled, light brownish gray and grayish brown channery silt loam 13 inches thick. The substratum is a firm layer of mottled, grayish brown channery loam 12 inches thick. Fractured siltstone and sandstone bedrock is at a depth of 34 inches.

Included with this soil in mapping are areas of Arnot, Tuller, Norwich, and Chippewa soils. Some areas are moderately steep. The included areas make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Greene soil is at a depth of 1/2 foot to 1 foot from late fall to late spring. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through this soil is moderate in the surface layer and moderately slow and slow in the subsoil and substratum. Available water capacity is moderate. Runoff is medium. In unlimed areas reaction of the surface layer is very strongly acid or strongly acid.

Most areas of this soil are wooded or in pasture. A few areas are used for corn or hay.

Drained areas of this soil are moderately suited to most crops grown in the county. Subsurface drains are usually difficult to install, however, because of the underlying bedrock. Interceptor drains help to divert runoff from higher adjacent areas. Erosion is a major hazard in cultivated areas. Conservation tillage, cross-slope tillage, stripcropping, and use of cover crops and crop residue will help to control erosion and maintain tilth.

This soil is suitable for pasture, but grazing when the soil is wet causes compaction of the surface layer and loss of desirable forage plants. Partial drainage or use of drains that intercept runoff from higher adjacent soils will improve most areas of this soil for pasture.

The potential productivity for trees on this soil is low. The seasonal high water table limits the use of equipment, causes a high seedling mortality rate, and restricts rooting, which causes a hazard of uprooting during windy periods.

The seasonal high water table, the depth to bedrock, and slope are major limitations of this soil for community and recreational development.

The capability subclass is IIIe.

Ha—Hamlin silt loam, low bottom. This soil is deep, nearly level, and well drained. It is on the lowest part of flood plains. The areas are oblong or in broad bands and range from 5 to 50 acres. They are subject to occasional, brief flooding, mainly in early spring.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is brown and dark brown silt loam 29 inches thick. The substratum is dark brown very fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Teel and Wayland soils and areas of sand and gravel. The included areas make up about 15 percent of this unit and are as much as 3 acres each.

This Hamlin soil has a seasonal high water table at a depth of 3 to 6 feet in early spring. The rate of water movement through the soil is moderate. Available water capacity is high. Runoff is slow. Reaction of the surface layer is strongly acid to neutral.

Most areas of this soil are used for cultivated crops, alfalfa-hay, and pasture.

This soil is well suited to most crops grown in the county. The flooding in early spring generally does not interfere with plowing and planting. Cultivation sometimes is delayed on some of the included wet soils, and drainage improves the suitability of those areas if suitable outlets can be located. Cover crops help to protect the soil surface from flood scouring during periods of stream overflow.

This soil is suitable for pasture. Overgrazing and grazing when the soil is wet are the major concerns of pasture management. Both cause the loss of desirable forage plants, and grazing when the soil is wet results in soil compaction.

The potential productivity for trees on this soil is high. Planting seedlings in the spring when the soil is moist helps to improve the survival rate.

Flooding and a frost-action potential are major limitations of this soil for community development.

The capability class is I.

Hb—Hamlin silt loam, high bottom. This soil is deep, nearly level, and well drained. It is on the second highest bench of the flood plain. The areas are rectangular and range from 3 to 40 acres. They are subject to rare, very brief flooding, mainly in early spring.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is brown and dark brown silt loam 29 inches thick. The substratum is dark brown very fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Teel and Wayland soils and areas of sand and gravel. The included areas make up about 15 percent of this unit and are as much as 3 acres each.

This Hamlin soil has a seasonal high water table at a depth of more than 6 feet. The rate of water movement through the soil is moderate. Available water capacity is high. Runoff is slow. Reaction of the surface layer is strongly acid to neutral.

Most areas of this soil are used for cultivated crops, alfalfa-hay, and pasture.

This soil is well suited to most crops grown in the county. Flooding sometimes delays cultivation briefly. Subsurface drainage improves the suitability of the included wet soils, and suitable drainage outlets generally can be established.

This soil is well suited to pasture. Overgrazing and grazing when the soil is wet are the major concerns of pasture management. Both cause the loss of desirable forage plants, and grazing when the soil is wet results in soil compaction.

The potential productivity for trees on this soil is high. Planting seedlings in the spring when the soil is moist increases the survival rate.

Flooding and a frost-action potential are major limitations of this soil for community development.

The capability class is I.

HoA—Howard gravelly loam, 0 to 3 percent slopes. This soil is deep, nearly level, and well drained to somewhat excessively drained. It is on terraces and the tops of benches in valleys. The areas are rectangular and range mostly from 5 to 20 acres.

Typically, the surface layer of this soil is dark grayish brown gravelly loam about 10 inches thick. The subsoil is 41 inches thick. The upper 10 inches of the subsoil is dark yellowish brown gravelly loam. The lower 31 inches is pale brown, dark brown, and yellowish brown very gravelly loam. The substratum is dark brown stratified very gravelly coarse sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Castile, Phelps, and Atherton soils and Howard soils that do not have a gravelly surface layer. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Howard soil is at a depth of more than 6 feet. The rate of water movement is moderate or moderately rapid in the surface layer and subsoil and very rapid in the substratum. Runoff is slow. Available water capacity is low. Reaction of the surface layer is strongly acid to neutral.

Most areas of this soil are used for corn and hay. Some areas are used for pasture, woodland, community development, or recreation.

This soil is well suited to most crops grown in the county, especially to corn, oats, and alfalfa. The gravelly surface layer hinders cultivation and harvesting of some crops and causes rapid wear of equipment. Droughtiness restricts crop growth in some years. Using cover crops and crop residue and conservation tillage help to maintain soil tilth and add organic matter, which improves the water holding capacity of the soil.

This soil is well suited to pasture. Restricting grazing during dry periods helps maintain desirable forage plants.

The potential productivity for trees on this soil is high. Planting seedlings in the spring when the soil is moist helps to increase the survival rate.

A frost-action potential limits this soil as a site for local roads and streets. The very rapid rate of water movement through the substratum causes a hazard of groundwater contamination in areas used for septic tank absorption fields.

The capability subclass is IIs.

HoB—Howard gravelly loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained to somewhat excessively drained. It is on terraces and undulating benches in valleys. The areas are rectangular and range mostly from 5 to 80 acres.

Typically, the surface layer of this soil is dark grayish brown gravelly loam about 10 inches thick. The subsoil is 41 inches thick. The upper 10 inches of the subsoil is dark yellowish brown gravelly loam. The lower 31 inches is pale brown, dark brown, and yellowish brown very gravelly loam. The substratum is dark brown stratified very gravelly coarse sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Castile, Phelps, and Atherton soils and Howard soils that do not have a gravelly surface layer. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Howard soil is at a depth of more than 6 feet. The rate of water movement is moderate or moderately rapid in the surface layer and subsoil and very rapid in the substratum. Runoff is slow to medium. Available water capacity is low. Reaction of the surface layer is strongly acid to neutral.

Most areas of this soil are used for corn and hay. Some areas are used for pasture, woodland, community development, or recreation.

This soil is well suited to most crops grown in the county, especially to corn, oats, and alfalfa. The gravelly surface layer hinders cultivation and harvesting of some crops and causes rapid wear of equipment. Droughtiness restricts crop growth in some years, and erosion is a hazard on long slopes. Cover crops, cross-slope tillage, use of crop residue, and conservation tillage help to control erosion, maintain soil tilth, and add organic matter to the soil, which improves the water holding capacity.

This soil is well suited to pasture. Restricting grazing during dry periods helps to maintain desirable forage plants.

The potential productivity for trees on this soil is high. Planting seedlings in the spring when the soil is moist helps to increase the survival rate.

A frost action potential limits this soil as a site for local roads and streets. The very rapid rate of water movement through the substratum causes a hazard of groundwater contamination in areas used for septic tank absorption fields.

The capability subclass is IIs.

HoC—Howard gravelly loam, 8 to 15 percent slopes. This soil is deep, sloping, and well drained to somewhat excessively drained. It is on the sides of large benches, ridges, and knolls in valleys. The areas are rectangular and range from 5 to 50 acres.

Typically, the surface layer of this soil is dark grayish brown gravelly loam about 10 inches thick. The subsoil is 41 inches thick. The upper 10 inches of the subsoil is dark yellowish brown gravelly loam. The lower 31 inches is pale brown, dark brown, and yellowish brown very gravelly loam. The substratum is dark brown stratified very gravelly coarse sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Castile, Phelps, and Atherton soils and Howard soils that do not have a gravelly surface layer. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Howard soil is at a depth of more than 6 feet. The rate of water movement is moderate or moderately rapid in the surface layer and subsoil and very rapid in the substratum. Runoff is medium. Available water capacity is low. Reaction of the surface layer is strongly acid to neutral.

Most areas of this soil are used for corn and hay. Some areas are in long-term hay and pasture, and some are used for woodland or community development.

This soil is suited to most crops grown in the county. Erosion is a hazard, particularly where slopes are long, and the gravelly surface layer hinders cultivation and harvesting of some crops and causes rapid wear of equipment. Droughtiness restricts crop growth in some years. Cover crops, cross-slope tillage, using crop residue, stripcropping where practical, and conservation tillage help to control erosion, maintain soil tilth, and add organic matter to the soil, which improves the water holding capacity.

This soil is well suited to pasture. Restricting grazing during dry periods helps maintain desirable forage plants and decreases the erosion hazard.

The potential productivity for trees on this soil is high. Planting seedlings in the spring when the soil is moist helps to increase the survival rate.

Slope, a frost-action potential, and the very rapid rate of water movement in the substratum are the main limitations of this soil for community development. The rate of water movement causes a hazard of ground-water contamination in areas used as a site for septic tank absorption fields.

The capability subclass is IIIe.

HoD—Howard gravelly loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained to somewhat excessively drained. It is on the sides of benches and on hilly areas in valleys. The areas are in narrow bands and range from 5 to 25 acres.

Typically, the surface layer of this soil is dark grayish brown gravelly loam about 10 inches thick. The subsoil is 41 inches thick. The upper 10 inches of the subsoil is dark yellowish brown gravelly loam. The lower 31 inches is pale brown, dark brown, and yellowish brown very gravelly loam. The substratum is dark brown stratified very gravelly coarse sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Phelps and Valois soils. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Howard soil is at a depth of more than 6 feet. The rate of water movement is moderate or moderately rapid in the surface layer and subsoil and very rapid in the substratum. Runoff is medium to rapid. Available water capacity is low. Reaction of the surface layer is strongly acid to neutral.

Most areas of this soil are used for pasture and woodland. Some of the less sloping areas are used for cultivated crops in rotation with long-term hay.

This soil is moderately suited to most crops grown in the county, but slope and an erosion hazard are major limitations.

This soil is suitable for pasture, but erosion is a hazard when the pasture is overgrazed or when adequate sod is not established. This soil is droughty, and restricting grazing in dry periods will help to maintain desirable forage plants.

The potential productivity for trees on this soil is high. Slope causes an erosion hazard and limits the use of some types of equipment. Planting seedlings in the spring when the soil is moist increases the rate of survival.

Slope is the major limitation of this soil for community development.

The capability subclass is IVe.

HoE—Howard gravelly loam, 25 to 35 percent slopes. This soil is deep, steep, and well drained to somewhat excessively drained. It is on the sides of terraces and along lower valley sides. The areas are narrow bands that range from 5 to 25 acres.

Typically, the surface layer of this soil is dark grayish brown gravelly loam about 10 inches thick. The subsoil is 41 inches thick. The upper 10 inches of the subsoil is dark yellowish brown gravelly loam. The lower 31 inches is pale brown, dark brown, and yellowish brown very gravelly loam. The substratum is dark brown stratified very gravelly coarse sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Valois and Arkport soils that make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Howard soil is at a depth of more than 6 feet. The rate of water movement is moderate or moderately rapid in the surface layer and subsoil and very rapid in the substratum. Runoff is rapid. Available water capacity is low. Reaction of the surface layer is strongly acid to neutral.

Most areas of this soil are in woodland. Some areas are used for pasture.

Slope makes this soil generally unsuitable for cultivated crops and poorly suited to pasture. Erosion is a severe hazard, especially when the pasture is overgrazed and where the sod cover is sparse. This soil is droughty during dry periods.

The potential productivity for trees on this soil is high. Slope causes an erosion hazard and limits the use of some types of equipment. Planting seedlings in the spring when the soil is moist increases the rate of survival.

Slope is the major limitation of this soil for community development.

The capability subclass is VIe.

HpA—Howard silt loam, 0 to 3 percent slopes. This soil is deep, nearly level, and well drained to somewhat excessively drained. It is on terraces and the tops of benches in valleys. The areas are rectangular and range from 3 to 20 acres.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The subsoil is 41 inches thick. The upper 8 inches of the subsoil is yellowish brown silt loam. The middle 11 inches is dark brown gravelly loam. The lower 22 inches is reddish brown very gravelly sandy clay loam. The substratum is dark grayish brown and very dark grayish brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are areas of Castile, Phelps, and Atherton soils and Howard soils with a gravelly surface layer. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Howard soil is at a depth of more than 6 feet. The rate of water movement is moderate to moderately rapid in the surface layer and subsoil and very rapid in the substratum. Runoff is slow. Available water capacity is low to moderate. Reaction of the surface layer is strongly acid to neutral.

Most areas of this soil are used for corn and hay. Some areas are used for pasture, woodland, community development, or recreation.

This soil is well suited to pasture and to most crops grown in the county, especially to corn, oats, and alfalfa. Using cover crops and crop residue helps to maintain tilth and increase organic matter content, which improves the water storing capacity of the soil.

The potential productivity for trees on this soil is high. Planting seedlings in early spring when the soil is moist helps to increase the survival rate.

A frost-action potential limits this soil as a site for local roads and streets. The very rapid rate of water movement through the substratum causes a hazard of groundwater contamination in areas used for septic tank absorption fields.

The capability class is I.

HpB—Howard silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained to somewhat excessively drained. It is on terraces and undulating benches in valleys. The areas are rectangular and range from 3 to 20 acres.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The subsoil is 41 inches thick. The upper 8 inches of the subsoil is yellowish brown silt loam. The middle 11 inches is dark brown gravelly loam. The lower 22 inches is reddish brown very gravelly sandy clay loam. The substratum is dark grayish brown and very dark grayish brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are areas of Castile, Phelps, and Atherton soils and Howard soils with a gravelly surface layer. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Howard soil is at a depth of more than 6 feet. The rate of water movement is moderate to moderately rapid in the surface layer and subsoil and very rapid in the substratum. Runoff is slow to medium. Available water capacity is low to moderate. Reaction of the surface layer is strongly acid to neutral.

Most areas of this soil are used for corn and hay. Some areas are used for pasture, woodland, community development, or recreation.

This soil is well suited to most crops grown in the county, especially to corn, oats, and alfalfa. Erosion is a hazard in cultivated areas. Use of cover crops and crop residue, conservation tillage, and cross-slope tillage will help to control erosion and improve the organic matter content, which will increase the moisture storing capacity of the soil.

This soil is suited to pasture. Restricting grazing during dry periods will help to maintain desirable forage species and reduce the erosion hazard.

The potential productivity for trees on this soil is high. Planting seedlings in early spring when the soil is moist will improve the survival rate.

A frost-action potential limits this soil as a site for local roads and streets. The very rapid rate of water movement through the substratum causes a hazard of groundwater contamination in areas used for septic tank absorption fields.

The capability subclass is IIe.

HpC—Howard silt loam, 8 to 15 percent slopes. This soil is deep, sloping, and well drained to somewhat excessively drained. It is on the sides of larger terraces and rolling knolls in valleys. The areas are rectangular and range from 5 to 20 acres.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The subsoil is 41 inches thick. The upper 8 inches of the subsoil is yellowish brown silt loam. The middle 11 inches is dark brown gravelly loam. The lower 22 inches is reddish brown very gravelly sandy clay loam. The substratum is dark grayish brown and very dark grayish brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are areas of Castile, Phelps, and Atherton soils and Howard soils with a gravelly surface layer. The areas of included soils make up about 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Howard soil is at a depth of more than 6 feet. The rate of water movement is moderate to moderately rapid in the surface layer and subsoil and very rapid in the substratum. Runoff is medium to rapid. Available water capacity is low to moderate. Reaction of the surface layer is strongly acid to neutral.

Some areas of this soil are used for corn and hay, and some are used for pasture, woodland, community development, or recreation.

This soil is suited to most crops grown in the county, but erosion is a hazard in cultivated areas. Cross-slope tillage and the use of cover crops and crop residue will help to control erosion and increase organic matter content, which will improve the moisture storing capacity of the soil.

This soil is suited to pasture. The hazard of soil erosion is the main limitation and is increased if the pasture is overgrazed or heavily grazed during dry periods.

The potential productivity for trees on this soil is high. Logging trails placed across the slope will help to eliminate any erosion hazard. Planting seedlings in the spring when the soil is moist will increase the rate of survival.

Slope, a frost-action potential, and the very rapid rate of water movement in the substratum are the main limitations of this soil for community development. The rate of water movement causes a hazard of ground-water contamination in areas used as a site for septic tank absorption fields.

The capability subclass is IIIe.

LaB—Lackawanna channery silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is on ridgetops and hilltops in upland areas. The areas are oblong and range from 5 to 50 acres.

Typically, the surface layer is very dark grayish brown channery silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is dark brown channery silt loam and brown very channery loam 28 inches thick. The lower part is a firm layer of mottled, dark reddish brown and reddish brown channery silt loam.

Included with this soil in mapping are areas of Wellsboro, Morris, Norwich, Oquaga, Lordstown, and Arnot soils and Lackawanna soils with a flaggy surface layer. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Lackawanna soil is at a depth of 2-1/2 to 6 feet from late fall to spring. The rate of water movement is moderate above the firm part of the subsoil and slow in the firm part. Runoff is medium. Available water capacity is moderate. In unlimed areas reaction of the surface layer is very strongly acid or strongly acid.

Most areas of this soil are used for hay and corn. Some areas are in pasture, and some others are used for woodland or community development.

This soil is suited to most crops grown in the county, especially to corn, small grains, and hay. Using cover crops and crop residue and conservation tillage will help to control a hazard of erosion. Rock fragments in the soil interfere with tillage, but generally the soil has good tilth. Droughtiness is a limitation in some years.

Pastures are well suited to this soil, but overgrazing, especially during dry periods, causes plant loss and increases the erosion hazard.

The potential productivity for trees on this soil is moderately high. Planting seedlings in spring when the soil is moist helps to increase the survival rate.

A frost-action potential and the seasonal high water table are limitations of this soil for community development. The slow rate of water movement in the firm part of the subsoil limits the soil as a site for septic tank absorption fields.

The capability subclass is IIe.

LaC—Lackawanna channery silt loam, 8 to 15 percent slopes. This soil is deep, sloping, and well drained. It is on the upper slopes of ridges and hills in upland areas. The areas are oblong and range from 5 to 30 acres.

Typically, the surface layer is very dark grayish brown channery silt loam about 5 inches thick. The subsoil

extends to a depth of 60 inches or more. The upper part of the subsoil is dark brown channery silt loam and brown very channery loam 28 inches thick. The lower part is a firm layer of mottled, dark reddish brown and reddish brown channery silt loam.

Included with this soil in mapping are areas of Wellsboro, Morris, Norwich, Oquaga, Lordstown, and Arnot soils and Lackawanna soils with a flaggy surface layer. Some areas have bedrock at a depth of 40 to 60 inches. The areas of included soils make up about 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Lackawanna soil is at a depth of 2-1/2 to 6 feet from late fall to spring. The rate of water movement is moderate above the firm part of the subsoil and slow in the firm part. Runoff is medium to rapid. Available water capacity is moderate. In unlimed areas reaction of the surface layer is very strongly acid or strongly acid.

Most areas of this soil are used for hay and corn. Some areas are in pastures, and some others are used for woodland or community development.

This soil is suited to most crops grown in the county, especially to corn, small grains, and hay. Using cover crops and crop residue and conservation tillage will help to control a hazard of erosion. Rock fragments in the soil interfere with tillage, but generally the soil has good tilth. Droughtiness is a limitation in some years.

Pastures are well suited to this soil, but overgrazing, especially during dry periods, causes plant loss and increases the erosion hazard.

The potential productivity for trees on this soil is moderately high. Planting seedlings in spring when the soil is moist helps to increase the survival rate.

A frost-action potential and the seasonal high water table are limitations of this soil for community development. The slow rate of water movement in the firm part of the subsoil limits the soil as a site for septic tank absorption fields.

The capability subclass is IIIe.

LaD—Lackawanna channery silt loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is on the side slopes of ridges and hills in upland areas. The areas are oblong and range from 10 to 80 acres.

Typically, the surface layer is very dark grayish brown channery silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is dark brown channery silt loam and brown very channery loam 28 inches thick. The lower part is a firm layer of mottled, dark reddish brown and reddish brown channery silt loam.

Included with this soil in mapping are areas of Wellsboro, Morris, Norwich, Oquaga, Lordstown, and Arnot soils and Lackawanna soils with a flaggy surface. Some areas have bedrock at a depth of 40 to 60 inches. The areas of included soils make up about 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Lackawanna soil is at a depth of 2-1/2 to 6 feet from late fall to spring. The rate of water movement is moderate above the firm part of the subsoil and slow in the firm part. Runoff is rapid. Available water capacity is moderate. In unlimed areas reaction of the surface layer is very strongly acid or strongly acid.

Most areas of this soil are used for pasture or woodland. Some less sloping areas are used for cultivated crops rotated with long-term hay and for some grain crops such as oats.

Slope makes this soil poorly suited to most crops grown in the county. Cross-slope tillage, stripcropping, and the use of cover crops and crop residue help to control the erosion hazard in cultivated areas.

This soil is suitable for pasture, but erosion is a hazard if pastures are overgrazed or an adequate sod cover is not established or maintained. The soil is droughty during dry periods.

The potential productivity for trees on this soil is moderately high. Slope causes an erosion hazard and limits the use of equipment. Planting seedlings in early spring when the soil is moist increases the survival rate.

Slope, a frost-action potential, and the slow rate of water movement in the firm part of the subsoil are the main limitations of the soil for community development.

The capability subclass is IVe.

LaE—Lackawanna channery silt loam, 25 to 35 percent slopes. This soil is deep, steep, and well drained. It is on hillsides and the sides of drainageways in upland areas. The areas are oblong and range from 10 to 100 acres.

Typically, the surface layer is very dark grayish brown channery silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is dark brown channery silt loam and brown very channery loam 28 inches thick. The lower part is a firm layer of mottled, dark reddish brown and reddish brown channery silt loam.

Included with this soil in mapping are areas of Wellsboro, Oquaga, Lordstown, and Arnot soils and Lackawanna soils with a flaggy surface layer below the soil surface. Some areas have bedrock at a depth of 40 to 60 inches. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Lackawanna soil is at a depth of 2-1/2 to 6 feet from late fall to spring. The rate of water movement is moderate above the firm part of the subsoil and slow in the firm part. Runoff is very rapid. Available water capacity is moderate. In unlimed areas reaction of the surface layer is very strongly acid or strongly acid.

Most areas of this soil are used for woodland or wildlife habitat. Some areas are used for unimproved pasture.

Slope makes this soil generally unsuitable for cultivated crops and poorly suited to pasture.

The potential productivity for trees on this soil is moderately high. Slope causes a hazard of erosion and limits the use of equipment. Placing logging roads on the contour helps to control trailside gullying.

Slope is the major limitation of this soil for most types of community development and for most nonfarm uses other than as wildlife habitat.

The capability subclass is VIe.

LnB—Lansing gravelly silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is on hilltops and foot slopes along valley sides. The areas are oblong and range from 5 to 50 acres.

Typically, the surface layer is dark brown gravelly silt loam about 9 inches thick. The subsurface layer is pale brown gravelly silt loam 6 inches thick. The subsoil is yellowish brown, brown, and dark brown gravelly silt loam 33 inches thick. The substratum is firm, grayish brown gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Phelps and Lordstown soils and Lansing soils with a nongravelly surface layer. Some areas have bedrock at a depth of 40 to 60 inches. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Lansing soil is at a depth of more than 6 feet. The rate of water movement is moderate above the substratum and slow in the substratum. Runoff is slow to medium. Available water capacity is moderate to high. Reaction of the surface layer is strongly acid to neutral.

Most areas of this soil are used for crops. Some areas are in pasture, and some others are used for woodland.

This soil is well suited to most crops grown in the county, especially to corn, oats, and hay. Gravel in the soil interferes with some tillage operations, but generally the soil is not difficult to till.

This soil is suited to pasture. Avoiding overgrazing will help to maintain desirable forage species.

The potential productivity for trees on this soil is high. Planting seedlings in spring when the soil is moist will help to increase the survival rate.

A frost-action potential and the slow rate of water movement through the substratum are the main limitations of the soil for community development.

The capability subclass is IIe.

LnC—Lansing gravelly silt loam, 8 to 15 percent slopes. This soil is deep, sloping, and well drained. It is on hillsides and valley sides. The areas are oval or oblong and range from 5 to 50 acres.

Typically, the surface layer is dark brown gravelly silt loam about 9 inches thick. The subsurface layer is pale brown gravelly silt loam 6 inches thick. The subsoil is yellowish brown, brown, and dark brown gravelly silt loam 33 inches thick. The substratum is firm, grayish brown gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Phelps and Lordstown soils and Lansing soils with a nongravelly surface layer. Some areas have bedrock at a depth of 40 to 60 inches. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Lansing soil is at a depth of more than 6 feet. The rate of water movement is moderate above the substratum and slow in the substratum. Runoff is medium to rapid. Available water capacity is moderate to high. Reaction of the surface layer is strongly acid to neutral.

Most areas of this soil are used for crops and pasture. Some areas are in woodland.

This soil is suited to most crops grown in the county, especially to corn, oats, and hay. Erosion is a moderate hazard. Cross-slope tillage, strip tillage, and the use of cover crops and crop residue are practices that help to control erosion and conserve moisture. Gravel in the soil interferes with cultivation, but generally the soil is fairly easy to till.

This soil is suited to pasture. Overgrazing causes a loss of desirable forage plants and increases the erosion hazard.

The potential productivity for trees on this soil is high. Planting seedlings in spring when the soil is moist will help increase the survival rate. Placing logging trails on the contour helps to control trailside gullying.

Slope, a frost-action potential, and the slow rate of water movement in the substratum are the main limitations of this soil for community development.

The capability subclass is IIIe.

LnD—Lansing gravelly silt loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is on hillsides and valley sides. The areas are oblong and range from 5 to 35 acres.

Typically, the surface layer is dark brown gravelly silt loam about 9 inches thick. The subsurface layer is pale brown gravelly silt loam 6 inches thick. The subsoil is yellowish brown, brown, and dark brown gravelly silt loam 33 inches thick. The substratum is firm, grayish brown gravelly loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Phelps and Lordstown soils and Lansing soils with a nongravelly surface layer. Some areas have bedrock at a depth of 40 to 60 inches. The areas of included soils make up about 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Lansing soil is at a depth of more than 6 feet. The rate of water move-

ment is moderate above the substratum and slow in the substratum. Runoff is rapid. Available water capacity is moderate to high. Reaction of the surface layer is strongly acid to neutral.

Most areas of this soil are used for pasture or woodland. Some less sloping areas are used for long-term hay or for a grain crop such as oats.

Slope makes this soil poorly suited to most crops grown in the county. Erosion is a major hazard in cultivated areas. Contour tillage, strip tillage, and using sod crops in the cropping system are practices that help to control erosion in cultivated areas.

This soil is suitable for pasture, but erosion is a hazard if the pasture is overgrazed or an adequate sod cover is not maintained.

The potential productivity for trees on this soil is high. Slope causes an erosion hazard and limits the use of some equipment. Planting seedlings in spring when the soil is moist helps to increase the survival rate.

Slope, a frost-action potential, and the slow rate of water movement in the substratum are the main limitations of this soil for community development.

The capability subclass is IVe.

LoB—Lordstown channery silt loam, 3 to 8 percent slopes. This soil is moderately deep, gently sloping, and well drained. It is on hilltops and upper parts of hillsides in upland areas. The areas are oblong or round and range from 5 to 100 acres.

Typically, the surface layer is dark brown channery silt loam about 9 inches thick. The subsoil is yellowish brown and brown channery silt loam 11 inches thick. The substratum is firm, grayish brown channery loam 4 inches thick. Sandstone bedrock is at a depth of 24 inches.

Included with this soil in mapping are areas of Greene, Tuller, Arnot, Valois, Mardin, Volusia, and Chippewa soils. Also included are Lordstown soils with a stony surface layer and soils that have bedrock at a depth of 40 to 60 inches. The areas of included soils make up about 20 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Lordstown soil is at a depth of more than 6 feet. The rate of water movement through the soil is moderate. Runoff is slow to medium. Available water capacity is moderate to low. Bedrock is at a depth of 20 to 40 inches. In unlimed areas reaction of the surface layer is very strongly acid to slightly acid.

Most areas of this soil are used for crops. Some areas are used for pasture, and some others are used for woodland.

This soil is suited to most crops grown in the county. Erosion is the main hazard, especially on long slopes. Rock fragments in the soil hinder the cultivation of some crops, and the soil is droughty. Cross-slope tillage, stripcropping, and use of cover crops will help to control the erosion hazard, increase tilth, and conserve moisture.

This soil is suited to pasture, but overgrazing causes a loss of forage plants and increases the erosion hazard.

The potential productivity for trees on this soil is moderately high. Planting seedlings in the spring when the soil is moist will help to increase the survival rate.

The depth to bedrock and a frost-action potential are the main limitations of this soil for community development.

The capability subclass is IIe.

LoC—Lordstown channery silt loam, 8 to 15 percent slopes. This soil is moderately deep, sloping, and well drained. It is on hillsides and the sides of valleys in upland areas. The areas are oblong or round and range from 10 to 150 acres.

Typically, the surface layer is dark brown channery silt loam about 9 inches thick. The subsoil is yellowish brown and brown channery silt loam 11 inches thick. The substratum is firm, grayish brown channery loam 4 inches thick. Sandstone bedrock is at a depth of 24 inches.

Included with this soil in mapping are areas of Greene, Tuller, Arnot, Valois, Mardin, Volusia, and Chippewa soils. Also included are Lordstown soils with a stony surface layer and soils that have bedrock at a depth of 40 to 60 inches. The areas of included soils make up about 20 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Lordstown soil is at a depth of more than 6 feet. The rate of water movement through the soil is moderate. Runoff is medium. Available water capacity is moderate to low. Bedrock is at a depth of 20 to 40 inches. In unlimed areas reaction of the surface layer is very strongly acid to slightly acid.

Many areas of this soil are used for hay and pasture or are in woodland. Some areas are used for corn.

This soil is moderately suited to most crops grown in the county. Erosion is a severe hazard. Rock fragments in the soil hinder the cultivation of some crops, and the soil is droughty. Cross-slope tillage, stripcropping, and the use of cover crops and crop residue will help to control the erosion hazard, increase tilth, and conserve moisture.

This soil is suited to pasture, but overgrazing causes a loss of forage plants and increases the erosion hazard.

The potential productivity for trees on this soil is moderately high. Planting seedlings in the spring when the soil is moist will help to increase survival rate.

The depth to bedrock, slope, and a frost-action potential are the main limitations of this soil for community development.

The capability subclass is IIIe.

LrE—Lordstown and Oquaga channery silt loams, 15 to 35 percent slopes. This unit consists of moder-

ately deep, moderately steep and steep soils on the sides of hills, ridges, and drainageways in upland areas. The areas are oblong or in bands and range from 10 to 200 acres. Some areas consist mostly of Lordstown soils, some mostly of Oquaga soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total acreage of the unit consists of about 50 percent well drained Lordstown soils, 35 percent well drained to excessively drained Oquaga soils, and 15 percent other soils.

Typically, the Lordstown soils have a surface layer of dark brown channery silt loam about 9 inches thick. The subsoil is yellowish brown and brown channery silt loam 11 inches thick. The substratum is firm, grayish brown channery loam 4 inches thick. Sandstone bedrock is at a depth of 24 inches.

Typically, the Oquaga soils have a surface layer of dark reddish brown channery silt loam about 3 inches thick. The subsurface layer is red channery silt loam 4 inches thick. The subsoil is 22 inches thick. The upper 8 inches of the subsoil is reddish brown channery silt loam, and the lower 14 inches is reddish brown very channery silt loam. Shale bedrock is at a depth of 29 inches.

Included with these soils in mapping are areas of Green, Tuller, Arnot, Mardin, Volusia, Chippewa, Wellsboro, and Morris soils. In some areas bedrock is at a depth of 10 to 20 inches or 40 to 60 inches, and in a few places it is exposed at the surface. Also included are Lordstown and Oquaga soils with a nonchannery surface layer. The areas of included soils are as much as 3 acres each.

The seasonal high water table in these Lordstown and Oquaga soils is at a depth of more than 6 feet. The rate of water movement through both soils is moderate. Runoff is rapid. Available water capacity is moderate to low in the Lordstown soils and low in the Oquaga soils. Bedrock is at a depth of 20 to 40 inches. In unlimed areas reaction of the surface layer is very strongly acid to slightly acid in the Lordstown soils and extremely acid to medium acid in the Oquaga soils.

Most areas of these soils are used for woodland. Some areas are used for pasture or as wildlife habitat.

Slope makes these soils generally unsuited to most crops grown in the county and poorly suited to pasture. Erosion is a major concern, particularly on the steeper and longer slopes. Overgrazing and grazing during dry periods cause a loss of forage plants and increase the erosion hazard. Reseeding and applying lime and fertilizer are difficult because of slope.

The potential productivity for trees on these soils is moderately high. Erosion is a hazard if logging trails are not placed on the contour. The slope restricts the use of some types of equipment. Planting seedlings in spring when the soil is moist improves the survival rate.

Slope and the depth to bedrock are major limitations of these soils for most types of community development and for most types of nonfarm uses other than as wildlife habitat.

The capability subclass is VIe.

LrF—Lordstown and Oquaga channery silt loams, 35 to 50 percent slopes. This unit consists of moderately deep, very steep soils on the sides of hills, ridges, and deep drainageways. The areas are long and narrow and range from 10 to 150 acres. Some areas consist mostly of Lordstown soils, some mostly of Oquaga soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total acreage of the unit consists of about 70 percent well drained Lordstown soils, 20 percent well drained to excessively drained Oquaga soils, and 10 percent other soils.

Typically, the Lordstown soils have a surface layer of dark brown channery silt loam about 9 inches thick. The subsoil is yellowish brown and brown channery silt loam 11 inches thick. The substratum is firm, grayish brown channery loam 4 inches thick. Sandstone bedrock is at a depth of 24 inches.

Typically, the Oquaga soils have a surface layer of dark reddish brown channery silt loam about 3 inches thick. The subsurface layer is red channery silt loam 4 inches thick. The subsoil is 22 inches thick. The upper 8 inches of the subsoil is reddish brown channery silt loam, and the lower 14 inches is reddish brown very channery silt loam. Shale bedrock is at a depth of 29 inches.

Included with these soils in mapping are areas of Arnot soils and Lordstown and Oquaga soils that have a very stony or bouldery surface layer. Areas of exposed bedrock are in a few spots. The included areas make up 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in these Lordstown and Oquaga soils is at a depth of more than 6 feet. The rate of water movement through both soils is moderate. Runoff is very rapid. Available water capacity is moderate to low in the Lordstown soils and low in the Oquaga soils. Bedrock is at a depth of 20 to 40 inches. In unlimed areas reaction of the surface layer is very strongly acid to slightly acid in the Lordstown soils and extremely acid to medium acid in the Oquaga soils.

Slope makes these soils generally unsuited to most crops grown in the county and poorly suited to pasture. Erosion is a major concern, particularly on the steeper and longer slopes. Overgrazing and grazing during dry periods cause a loss of forage plants and increase the erosion hazard. Reseeding and applying lime and fertilizer are difficult because of slope.

These soils are mainly in woodland, and the potential productivity for trees on these soils is moderately high. Erosion is a hazard along logging trails. The slope limits the use of planting and harvesting equipment.

Slope and the depth to bedrock are major limitations of these soils for community development and limit the soils for most types of nonfarm use other than as wildlife habitat.

The capability subclass is VIIe.

MaB—Mardin channery silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is on slightly convex areas on uplands. The areas are oblong and range from 5 to 150 acres.

Typically, the surface layer is dark brown channery silt loam about 6 inches thick. The subsoil is 40 inches thick. The upper 10 inches of the subsoil is yellowish brown and pale brown channery silt loam that is mottled in the lower 4 inches. The lower 30 inches of the subsoil is mottled, very firm grayish brown channery loam and brown channery silt loam. The substratum is mottled, firm, brown very channery loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Volusia, Chippewa, Lordstown, Greene, and Tuller soils. Also included are areas that have bedrock at a depth of 40 to 60 inches and Mardin soils with a very stony surface layer. The areas of included soils are as much as 3 acres each and make up about 15 percent of this unit.

The seasonal high water table in this Mardin soil is at a depth of 1-1/2 to 2 feet during early spring. The rate of water movement through the soil is moderate above the firm layers and slow or very slow in the firm layers. Runoff is medium. Available water capacity is low to moderate. In unlimed areas reaction of the surface layer is extremely acid to slightly acid.

Most areas of this soil are used for cultivated crops, hay, or pasture. Some areas are in woodland or community development or are used for recreation.

This soil is suited to most crops grown in the county, especially to corn, small grains, potatoes, and hay. The main limitation for farming is the seasonal high water table, which sometimes delays tillage. Erosion is a hazard, particularly on long slopes, and rock fragments in the soil hinder some tillage operations. Cross-slope tillage, cover crops, and a conservation tillage system will help to control the erosion hazard.

This soil is well suited to pasture, although grazing during wet periods restricts plant growth and causes compaction of the soil. Overgrazing causes a loss of forage plants and increased erosion and soil compaction.

The potential productivity for trees on this soil is moderately high. There are few limitations for management, but the restricted rooting depth hinders the growth of some tree species.

The seasonal high water table, the slow or very slow rate of water movement in the lower part of the soil, and a frost-action potential are the main limitations of this soil for community development.

The capability subclass is IIw.

MaC—Mardin channery silt loam, 8 to 15 percent slopes. This soil is deep, sloping, and moderately well drained. It is on the sides of hills and ridges on uplands. The areas of this soil are oblong and range from 5 to 100 acres.

Typically, the surface layer is dark brown channery silt loam about 6 inches thick. The subsoil is 40 inches thick. The upper 10 inches of the subsoil is yellowish brown and pale brown channery silt loam that is mottled in the lower 4 inches. The lower 30 inches of the subsoil is mottled, very firm grayish brown channery loam and brown channery silt loam. The substratum is mottled, firm, brown very channery loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Volusia, Chippewa, Lordstown, Arnot, Greene, and Tuller soils. Also included are areas that have bedrock at a depth of 40 to 60 inches and Mardin soils with a very stony surface layer. The areas of included soils are as much as 3 acres each and make up about 20 percent of this unit.

The seasonal high water table in this Mardin soil is at a depth of 1-1/2 to 2 feet during early spring. The rate of water movement through the soil is moderate above the firm layers and slow or very slow in the firm layers. Runoff is medium or rapid. Available water capacity is low to moderate. In unlimed areas reaction of the surface layer is extremely acid to slightly acid.

Most areas of this soil are used for cultivated crops, hay, and pasture. Some areas are in woodland or are used for community development.

This soil is suited to most crops grown in the county. Erosion is a hazard, particularly on long slopes. The seasonal high water table delays normal tillage operations, and rock fragments in the soil hinder some planting and harvesting operations. Cross-slope tillage, stripcropping, using crop residue and cover crops, and conservation tillage help to reduce the erosion hazard and maintain good tilth.

This soil is suited to pasture. Grazing during wet periods restricts plant growth and causes surface compaction, and overgrazing causes a loss of forage plants and an increased erosion hazard.

The potential productivity for trees on this soil is moderately high. There are few limitations for management, but a restricted rooting depth limits the choice of tree species.

Slope, a potential frost action, seasonal wetness, and the slow or very slow rate of water movement through the lower part of the soil are major limitations of the soil for community development.

The capability subclass is IIIe.

MaD—Mardin channery silt loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and moderately well drained. It is on the sides of hills and ridges on

uplands. The areas of this soil are oblong and range from 10 to 100 acres.

Typically, the surface layer is dark brown channery silt loam about 6 inches thick. The subsoil is 40 inches thick. The upper 10 inches of the subsoil is yellowish brown and pale brown channery silt loam that is mottled in the lower 4 inches. The lower 30 inches of the subsoil is mottled, very firm grayish brown channery loam and brown channery silt loam. The substratum is mottled, firm, brown very channery loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Volusia, Lordstown, Arnot, Greene, and Tuller soils. Also included are areas that have bedrock at a depth of 40 to 60 inches and Mardin soils with a very stony surface layer. The included areas make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Mardin soil is at a depth of 1-1/2 to 2 feet during early spring. The rate of water movement through the soil is moderate above the firm layers and slow or very slow in the firm layers. Runoff is rapid. Available water capacity is low to moderate. In unlimed areas reaction of the surface layer is extremely acid to slightly acid.

Most areas of this soil are used for pasture. Some areas are in woodland and provide wildlife habitat. A few of the less sloping areas are used for cultivated crops.

Slope makes this soil poorly suited to most crops grown in the county. Erosion is a major hazard in cultivated areas. Stripcropping, contour tillage, and using sod crops, cover crops, and crop residue will help to control erosion, conserve moisture, and maintain tilth in cultivated areas.

This soil is moderately suited to pasture. Erosion is a major hazard, especially when the pasture is overgrazed. Overgrazing also causes a loss of forage plants, and grazing during wet periods causes surface compaction and reduces plant growth.

The potential productivity for trees on this soil is moderately high. Slope limits the use of some types of equipment. Erosion is a hazard along logging roads unless the roads are placed on the contour.

Slope, a potential frost action, seasonal wetness, and the slow or very slow rate of water movement through the lower part of the soil are major limitations of the soil for community development.

The capability subclass is IVe.

MbE—Mardin and Lackawanna very stony silt loams, 15 to 35 percent slopes. This unit consists of deep, moderately steep and steep soils on the sides of hills, valleys, and ridges in upland areas. The areas of these soils are oblong and range from 8 to 60 acres. Large stones are about 5 to 20 feet apart on the surface. Some areas consist mostly of Mardin soils, some mostly of Lackawanna soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total acreage of the unit is about 40 percent moderately well drained Mardin soils, 40 percent well drained Lackawanna soils, and 20 percent other soils.

Typically, the Mardin soils have a surface layer of dark brown channery silt loam about 6 inches thick. The subsoil is 40 inches thick. The upper 10 inches of the subsoil is yellowish brown and pale brown channery silt loam that is mottled in the lower 4 inches. The lower 30 inches of the subsoil is mottled, very firm grayish brown channery loam and brown channery silt loam. The substratum is mottled, firm, brown very channery loam to a depth of 60 inches or more.

Typically, the Lackawanna soils have a surface layer of very dark grayish brown channery silt loam about 5 inches thick. The upper part of the subsoil is 28 inches thick. It is dark brown and brown channery silt loam and very channery loam. The lower part of the subsoil is 27 inches thick. It is mottled, firm dark reddish brown and reddish brown channery silt loam. The substratum at a depth of more than 60 inches is firm, reddish brown channery silt loam.

Included with these soils in mapping are areas of Volusia, Morris, Lordstown, Oquaga, and Arnot soils. Some areas have bedrock at a depth of 40 to 60 inches, and a few areas do not have stones on the surface. The included areas are as much as 3 acres each.

A seasonal high water table in winter and spring is at a depth of 1-1/2 to 2 feet in these Mardin soils and at 2-1/2 to 6 feet in these Lackawanna soils. The rate of water movement through both soils is moderate above the firm parts of the soils and slow or very slow in the firm parts. Runoff is rapid. Available water capacity is low to moderate in the Mardin soils and moderate in the Lackawanna soils. In unlimed areas reaction of the surface layer is extremely acid to slightly acid in the Mardin soils and strongly acid or very strongly acid in the Lackawanna soils.

Most areas of these soils are in woodland. Some areas are used for pasture or as wildlife habitat.

Slope and the stones on the surface make these soils generally unsuited to most crops grown in the county and poorly suited to pasture. The slope and the stones limit the use of equipment for seeding and other types of farming management.

The potential productivity for trees on these soils is moderately high. The stones and slope are the main limitations for management, and erosion is a hazard along logging trails unless the trails are placed on the contour. Planting seedlings in the spring when the soil is moist will help to improve the survival rate.

Slope, the stones on the surface, and the slow or very slow rate of water movement in the lower part of the soils are major limitations for most types of community development and for most nonfarm uses other than wildlife habitat.

The capability subclass is VIIs.

McB—Mardin and Wellsboro very stony silt loams, 3 to 8 percent slopes. This unit consists of deep, gently sloping, moderately well drained soils on slightly convex upland areas on hilltops and on the upper sides of valleys. The areas of these soils are mostly oblong and range from 5 to 30 acres. Stones that are more than 10 inches in diameter are about 5 to 25 feet apart on the surface. Some areas consist mostly of Mardin soils, some mostly of Wellsboro soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total acreage of the unit is about 50 percent Mardin soils, 30 percent Wellsboro soils, and 20 percent other soils.

Typically, the Mardin soils have a surface layer of dark brown channery silt loam about 6 inches thick. The subsoil is 40 inches thick. The upper 10 inches of the subsoil is yellowish brown and pale brown channery silt loam that is mottled in the lower 4 inches. The lower 30 inches of the subsoil is mottled, very firm grayish brown channery loam and brown channery silt loam. The substratum is mottled, firm, brown very channery loam to a depth of 60 inches or more.

Typically, the Wellsboro soils have a surface layer of dark brown channery silt loam about 8 inches thick. The subsoil is 50 inches thick. The upper 10 inches of the subsoil is reddish brown channery silt loam. The lower 40 inches of the subsoil is firm, reddish brown channery silt loam. The substratum is firm, reddish brown channery silt loam to a depth of 60 inches or more.

Included with these soils in mapping are areas of Volusia, Morris, Norwich, Chippewa, Lordstown, Oquaga, and Arnot soils. Some areas have bedrock at a depth of 40 to 60 inches, and a few areas do not have large stones on the surface. The areas of included soils are as much as 3 acres each.

A seasonal high water table in winter and spring is at a depth of 1-1/2 to 2 feet in these Mardin soils and at 1-1/2 to 3 feet in these Wellsboro soils. The rate of water movement in these soils is moderate above the firm parts of the soils, slow or very slow in the firm part of the Mardin soils, and slow in the firm part of the Wellsboro soils. Runoff is medium. Available water capacity is low to moderate in the Mardin soils and moderate in the Wellsboro soils. In unlimed areas reaction of the surface layer is extremely acid to slightly acid in the Mardin soils and very strongly acid to medium acid in the Wellsboro soils.

Most areas of these soils are used for pasture. Some areas are in woodland and provide wildlife habitat.

The stones on the surface make these soils generally unsuited to most crops grown in the county. The stones especially limit the use of tillage equipment.

These soils are suited to permanent pasture. The stones on the surface restrict the use of equipment for reseeding and applying lime and fertilizer. Overgrazing during dry periods causes reduced forage quality.

The potential productivity for trees on these soils is moderately high to high. There are few limitations for management, but the stones hinder the use of some types of equipment for harvesting and for planting of seedlings.

Seasonal wetness, the stones on the surface, a frost-action potential, and the slow or very slow rate of water movement through the lower parts of these soils are major limitations for community development and limit the soils for most types of nonfarm use other than as wildlife habitat.

The capability subclass is VIs.

McC—Mardin and Wellsboro very stony silt loams, 8 to 15 percent slopes. This unit consists of deep, sloping, moderately well drained soils on slightly convex upland areas on hillsides and on sides of valleys. The areas of these soils are mostly oblong and range from 5 to 30 acres. Stones that are more than 10 inches in diameter are about 5 to 25 feet apart on the surface. Some areas consist mostly of Mardin soils, some mostly of Wellsboro soils, and some of both. These soils were mapped together because they have no major differences in use and management. The total acreage of the unit is about 40 percent Mardin soils, 30 percent Wellsboro soils, and 30 percent other soils.

Typically, the Mardin soils have a surface layer of dark brown channery silt loam about 6 inches thick. The subsoil is 40 inches thick. The upper 10 inches of the subsoil is yellowish brown and pale brown channery silt loam that is mottled in the lower 4 inches. The lower 30 inches of the subsoil is mottled, very firm grayish brown channery loam and brown channery silt loam. The substratum is mottled, firm, brown very channery loam to a depth of 60 inches or more.

Typically, the Wellsboro soils have a surface layer of dark brown channery silt loam about 8 inches thick. The subsoil is 50 inches thick. The upper 10 inches of the subsoil is reddish brown channery silt loam. The lower 40 inches of the subsoil is firm, reddish brown channery silt loam. The substratum is firm, reddish brown channery silt loam to a depth of 60 inches or more.

Included with these soils in mapping are areas of Volusia, Morris, Norwich, Chippewa, Lordstown, Oquaga, and Arnot soils. Some areas have bedrock at a depth of 40 to 60 inches, and a few areas do not have large stones on the surface. The areas of included soils are as much as 3 acres each.

A seasonal high water table in winter and spring is at a depth of 1-1/2 to 2 feet in these Mardin soils and at 1-1/2 to 3 feet in these Wellsboro soils. The rate of water movement in these soils is moderate above the firm parts of the soils, slow or very slow in the firm part of the Mardin soils, and slow in the firm part of the Wellsboro soils. Runoff is medium. Available water capacity is low to moderate in the Mardin soils and moderate in the Wellsboro soils. In unlimed areas reaction of the surface

layer is extremely acid to slightly acid in the Mardin soils and very strongly acid to medium acid in the Wellsboro soils.

Most areas of these soils are used for pasture. Some areas are in woodland and provide wildlife habitat.

The stones on the surface make these soils generally unsuited to most crops grown in the county. The stones especially limit the use of tillage equipment.

These soils are suited to permanent pasture. The stones on the surface restrict the use of equipment for reseeding and applying lime and fertilizer. Overgrazing during dry periods causes reduced forage quality.

The potential productivity for trees on these soils is moderately high on the Mardin soils and high on the Wellsboro soils. There are few limitations for management, but the stones hinder the use of some equipment for harvesting and for planting of seedlings. Placing logging trails on the contour will help to eliminate any hazard of gullying.

Seasonal wetness, the stones on the surface, a frost-action potential, and the slow or very slow rate of water movement through the lower parts of these soils are major limitations for community development and limit the soils for most types of nonfarm use other than as wildlife habitat.

The capability subclass is VIs.

MoA—Morris channery silt loam, 0 to 3 percent slopes. This soil is deep, nearly level, and somewhat poorly drained. It is on hilltops, in low areas, and on foot slopes on uplands. The areas of this soil are rectangular and range from 5 to 75 acres.

Typically, the surface layer is dark grayish brown channery silt loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is mottled, grayish brown channery silt loam 12 inches thick. The lower part of the subsoil is firm, mottled, reddish brown channery silt loam.

Included with this soil in mapping are areas of Norwich, Oquaga, Lordstown, and Arnot soils. Some areas have bedrock at a depth of 40 to 60 inches, and some areas of Morris soils are very stony on the surface. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Morris soil is at a depth of 1/2 foot to 1-1/2 feet from late fall to spring. The rate of water movement through the soil is moderate above the firm part of the subsoil and slow or very slow in the firm part. Runoff is slow. Available water capacity is low. Reaction of the surface layer in unlimed areas is very strongly acid to medium acid.

Most areas of this soil are used for pasture. Some areas are used for crops, and a few others are in woodland and provide habitat for wildlife.

This soil is moderately suited to most crops grown in the county. The seasonal wetness during the spring delays tillage and is the main limitation for crops. Subsurface drains and interceptor drains that divert runoff from higher adjacent soils will allow early cultivation of most fields. Although the moisture storing capacity of the soil is low because of the restricted rooting depth, the moisture content generally is sufficient for crops throughout the growing season.

This soil is moderately suited to pasture. Grazing when the soil is too wet causes soil compaction and eventual loss of desirable forage plants.

The potential productivity for trees on this soil is moderately high. Seasonal wetness restricts the use of equipment and causes a high rate of seedling mortality. The firm part of the subsoil restricts rooting and makes uprooting a hazard for some trees during windy periods.

Seasonal wetness and the slow or very slow rate of water movement in the firm part of the subsoil are the main limitations of this soil for community development.

The capability subclass is IIIw.

MoB—Morris channery silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and somewhat poorly drained. It is in low areas and on concave foot slopes on uplands. The areas of this soil are rectangular and range from 5 to 100 acres.

Typically, the surface layer is dark grayish brown channery silt loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is mottled, grayish brown channery silt loam 12 inches thick. The lower part of the subsoil is firm, mottled, reddish brown channery silt loam.

Included with this soil in mapping are areas of Norwich, Oquaga, Lordstown, and Arnot soils. Some areas have bedrock at a depth of 40 to 60 inches, and some areas of Morris soils are very stony on the surface. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Morris soil is at a depth of 1/2 foot to 1-1/2 feet from late fall to spring. The rate of water movement through the soil is moderate above the firm part of the subsoil layers and slow or very slow in the firm part. Runoff is medium. Available water capacity is low. Reaction of the surface layer in unlimed areas is very strongly acid to medium acid.

Most areas of this soil are used for pasture (fig. 7). Some areas are used for crops, and some are in woodland and provide habitat for wildlife.

This soil is moderately suited to most crops grown in the county. Seasonal wetness during the spring delays tillage. Subsurface drains and interceptor drains that divert runoff from higher adjacent soils will allow early cultivation of most fields. Erosion is a hazard in cultivated areas but can be controlled with such conservation practices as cross-slope tillage, the use of cover crops and sod crops in the cropping system, and the use of crop residue. Although moisture storing capacity of the soil is low because of the restricted rooting depth, the

Figure 7.—A pond and forage crops on an area of Morris channery silt loam, 3 to 8 percent slopes.

moisture content generally is sufficient for crops throughout the growing season.

This soil is moderately suited to pasture. Grazing when the soil is too wet causes soil compaction and eventual loss of desirable forage plants.

The potential productivity for trees on this soil is moderately high. Seasonal wetness restricts the use of equipment and causes a high rate of seedling mortality. The firm part of the subsoil restricts rooting and makes uprooting a hazard for some trees during windy periods.

Seasonal wetness and the slow or very slow rate of water movement in the firm part of the subsoil are the main limitations of this soil for community development.

The capability subclass is IIIw.

MoC—Morris channery silt loam, 8 to 15 percent slopes. This soil is deep, sloping, and somewhat poorly drained. It is on lower valley sides and on foot slopes of hills on uplands. The areas of this soil are rectangular and range from 8 to 80 acres.

Typically, the surface layer is dark grayish brown channery silt loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is mottled, grayish brown channery silt loam 12 inches thick. The lower part of the subsoil is firm, mottled, reddish brown channery silt loam.

Included with this soil in mapping are areas of Norwich, Oquaga, Lordstown, and Arnot soils. Some areas have bedrock at a depth of 40 to 60 inches, and some areas of Morris soils are very stony on the surface. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Morris soil is at a depth of 1/2 foot to 1-1/2 feet from late fall to spring. The rate of water movement through the soil is moderate above the firm part of the subsoil layers, and slow or very slow in the firm part. Runoff is medium to rapid. Available water capacity is low. Reaction of the surface layer in unlimed areas is very strongly acid to medium acid.

Most areas of this soil are used for pasture. A few areas are used for crops, and some are in woodland and provide habitat for wildlife.

This soil is moderately suited to most crops grown in the county. Seasonal wetness delays tillage, and slope causes a severe erosion hazard. Interceptor drains help to divert runoff from higher adjacent soils, allowing early cultivation. Cross-slope tillage, stripcropping, conservation tillage, and the use of sod crops and cover crops in the cropping system help to control erosion, increase organic matter content, and maintain tilth.

This soil is moderately suited to pasture. Grazing when the soil is too wet causes soil compaction and eventual loss of desirable forage plants. Overgrazing during dry periods reduces the desirable forage species and increases the hazard of soil erosion.

The potential productivity for trees on this soil is moderately high. Seasonal wetness restricts the use of equipment and causes a high seedling mortality rate. The firm part of the subsoil restricts rooting, and some trees are uprooted during windy periods. Placing logging trails on the contour will help to avoid the hazard of trailside gullying.

Slope, seasonal wetness, and the slow or very slow rate of water movement in the firm part of the subsoil are the main limitations of the soil for community development.

The capability subclass is IIIe.

OaB—Oquaga channery silt loam, 3 to 8 percent slopes. This soil is moderately deep, gently sloping, and well drained to excessively drained. It is on the tops and sides of hills on uplands. The areas are long and narrow and range from 5 to 90 acres.

Typically, a thin mat of leaves and twigs is on the surface. The surface layer is dark reddish brown channery silt loam about 3 inches thick. The subsurface layer is red channery silt loam 4 inches thick. The subsoil is 22 inches thick. The upper 18 inches of the subsoil is reddish brown channery and very channery silt loam. The lower 4 inches is firm, reddish brown very channery silt loam. Reddish gray shale bedrock is at a depth of 29 inches.

Included with this soil in mapping are areas of Arnot and Tuller soils. Some areas have bedrock at a depth of 40 to 60 inches, and a few areas have large stones on the surface. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Oquaga soil is at a depth of more than 6 feet. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through the soil is moderate, and runoff is medium. Available water capacity is low. In unlimed areas the surface layer is extremely acid to medium acid.

Most areas of this soil are used for pasture or are in woodland. Some areas are used for hay and cultivated crops.

This soil is moderately suited to most crops grown in the county. Rock fragments in the surface layer hinder some tillage and harvesting operations, and a restricted rooting depth causes droughtiness in some years. Although erosion is only a slight hazard, avoiding soil loss is necessary because of the moderate soil depth to bedrock. Contour tillage, the use of cover crops, and conservation tillage will help to control erosion, conserve moisture, and improve tilth.

This soil is suited to pasture. Overgrazing during dry periods causes a loss of forage plants and an increase in erosion.

The potential productivity for trees on this soil is moderately high. The seedling mortality rate is usually low if seedlings are planted in early spring.

The depth to bedrock is the main limitation of this soil for most types of community development.

The capability subclass is IIe.

OaC—Oquaga channery silt loam, 8 to 15 percent slopes. This soil is moderately deep, sloping, and well drained to excessively drained. It is on the sides of hills on uplands. The areas are long and narrow and range from 5 to 50 acres.

Typically, a thin mat of leaves and twigs is on the surface. The surface layer is dark reddish brown channery silt loam about 3 inches thick. The subsurface layer is red channery silt loam 4 inches thick. The subsoil is 22 inches thick. The upper 18 inches of the subsoil is reddish brown channery and very channery silt loam. The lower 4 inches is firm, reddish brown very channery silt loam. Reddish gray shale bedrock is at a depth of 29 inches.

Included with this soil in mapping are areas of Arnot and Tuller soils. Some areas have bedrock at a depth of 40 to 60 inches, and a few areas have large stones on the surface. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Oquaga soil is at a depth of more than 6 feet. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through the soil is moderate, and runoff is medium to rapid. Available water capacity is low. In unlimed areas the surface layer is extremely acid to medium acid.

Most areas of this soil are used for pasture or are in woodland. Some areas are used for hay and cultivated crops.

This soil is moderately suited to most crops grown in the county. Erosion is a hazard on this soil, particularly on long slopes. Contour tillage, stripcropping, the use of cover crops, and conservation tillage systems will help to control erosion, conserve moisture, and improve soil tilth.

This soil is suited to pasture, but forage yields are often low in dry years. Overgrazing during dry periods causes a loss of forage plants and an increase in erosion.

The potential productivity for trees on this soil is moderately high. The rate of seedling mortality is usually low if seedlings are planted in early spring.

Slope and the depth to bedrock are the main limitations of this soil for most types of community development.

The capability subclass is IIIe.

OlB—Oquaga and Lordstown very stony silt loams, 3 to 8 percent slopes. This unit consists of moderately deep, gently sloping soils on the tops and sides of hills on uplands. Large stones and boulders are about 5 to 25 feet apart on the surface. The areas are oblong and range from 5 to 100 acres. Some areas consist mostly of Oquaga soils, some mostly of Lordstown soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total acreage of this unit is about 50 percent excessively drained to well drained Oquaga soils, 35 percent well drained Lordstown soils, and 15 percent other soils.

Typically, a thin mat of leaves and twigs is on the surface of the Oquaga soils. The surface layer is dark reddish brown silt loam about 3 inches thick. The subsurface layer is red channery silt loam 4 inches thick. The subsoil is 22 inches thick. The upper 18 inches of the subsoil is reddish brown channery and very channery silt loam. The lower 4 inches is firm, reddish brown very channery silt loam. Reddish gray shale bedrock is at a depth of 29 inches.

Typically, the Lordstown soils have a surface layer of dark brown silt loam about 9 inches thick. The subsoil is yellowish brown and brown channery silt loam 11 inches thick. The substratum is firm, grayish brown channery silt loam 4 inches thick. Dark gray, fine-grained sandstone bedrock is at a depth of 24 inches.

Included with this unit in mapping are areas of Mardin, Tuller, and Arnot soils. Some areas have bedrock at a depth of 40 to 60 inches. A few areas of Oquaga and Lordstown soils do not have large stones on the surface. The areas of included soils are as much as 3 acres each.

The seasonal high water table in these Oquaga and Lordstown soils is at a depth of more than 6 feet. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through both soils is moderate. Available water capacity is low in the Oquaga soils and moderate to low in the Lordstown soils. Runoff is medium. In unlimed areas the surface layer is extremely acid to medium acid in the Oquaga soils and very strongly acid to slightly acid in the Lordstown soils.

Most areas of this unit are in woodland or used for pasture.

The stones on the surface make these soils generally unsuited to most crops grown in the county. The stones prohibit the use of most types of tillage and harvesting equipment. If stones are cleared, the soils are suitable for many crops, but erosion is a hazard.

These soils are suitable for pasture. Overgrazing during dry periods causes a loss of desirable forage plants and increases the erosion hazard. The stones on the surface make the establishment of plants and the application of lime and fertilizer difficult.

The potential productivity for trees on this unit is moderately high. The stones on the surface hinder the use of planting and harvesting equipment. Planting seedlings in early spring when the soil is moist helps to increase the rate of survival.

The depth to bedrock and the stones on the surface are the main limitations of this unit for most types of community development and recreational uses.

The capability subclass is VIs.

OlC—Oquaga and Lordstown very stony silt loams, 8 to 15 percent slopes. This unit consists of moderately deep, sloping soils on the sides of hills on uplands. Large stones and boulders are about 5 to 25 feet apart on the surface. The areas are oblong and range from 5 to 50 acres. Some areas consist mostly of Oquaga soils, some mostly of Lordstown soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total acreage of this unit is about 50 percent Oquaga soils, 35 percent Lordstown soils, and 15 percent other soils.

Typically, a thin mat of leaves and twigs is on the surface of the Oquaga soils. The surface layer is dark reddish brown silt loam about 3 inches thick. The subsurface layer is red channery silt loam 4 inches thick. The subsoil is 22 inches thick. The upper 18 inches of the subsoil is reddish brown channery and very channery silt loam. The lower 4 inches is firm, reddish brown very channery silt loam. Reddish gray shale bedrock is at a depth of 29 inches.

Typically, the Lordstown soils have a surface layer of dark brown silt loam about 9 inches thick. The subsoil is yellowish brown and brown channery silt loam 11 inches thick. The substratum is firm, grayish brown channery silt loam 4 inches thick. Dark gray, fine-grained sandstone bedrock is at a depth of 24 inches.

Included with this unit in mapping are areas of Mardin, Tuller, and Arnot soils. Some areas have bedrock at a depth of 40 to 60 inches. A few areas of Oquaga and Lordstown soils do not have large stones on the surface. The areas of included soils are as much as 3 acres each.

The seasonal high water table in these Oquaga and Lordstown soils is at a depth of more than 6 feet. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through both soils is moderate. Available water capacity is low in the Oquaga soils and moderate to low in the Lordstown soils. Runoff is medium to rapid. In unlimed areas the surface layer is extremely acid to medium acid in the Oquaga soils and very strongly acid to slightly acid in the Lordstown soils.

Most areas of this unit are in woodland or used for pasture.

The stones on the surface make these soils generally unsuited to most crops grown in the county. The stones

prohibit the use of most types of tillage and harvesting equipment. If the stones are cleared, the soils are suitable for many crops, but erosion is a hazard.

These soils are suitable for pasture. Overgrazing during dry periods causes a loss of desirable forage plants and increases the erosion hazard. The stones on the surface make the establishment of plants and the application of lime and fertilizer difficult.

The potential productivity for trees on this unit is moderately high. The stones on the surface hinder the use of planting and harvesting equipment. Planting seedlings in early spring when the soil is moist helps to increase the rate of survival.

The depth to bedrock, the stones on the surface, and slope are the main limitations of this unit for most types of community development and recreational uses.

The capability subclass is VIs.

OlE—Oquaga and Lordstown very stony silt loams, 15 to 35 percent slopes. This unit consists of moderately deep, moderately steep and steep soils on the sides of hills and valleys. Large stones and boulders are about 5 to 25 feet apart on the surface. The areas are long and narrow and range from 10 to 50 acres. Some areas consist mostly of Oquaga soils, some mostly of Lordstown soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total acreage of this unit is about 60 percent Oquaga soils, 30 percent Lordstown soils, and 10 percent other soils.

Typically, a thin mat of leaves and twigs is on the surface of the Oquaga soils. The surface layer is dark reddish brown silt loam about 3 inches thick. The subsurface layer is red channery silt loam 4 inches thick. The subsoil is 22 inches thick. The upper 18 inches of the subsoil is reddish brown channery and very channery silt loam. The lower 4 inches is firm, reddish brown very channery silt loam. Reddish gray shale bedrock is at a depth of 29 inches.

Typically, the Lordstown soils have a surface layer of dark brown silt loam about 9 inches thick. The subsoil is yellowish brown and brown channery silt loam 11 inches thick. The substratum is firm, grayish brown channery silt loam 4 inches thick. Dark gray, fine-grained sandstone bedrock is at a depth of 24 inches.

Included with this unit in mapping are areas of Arnot soils, soils that have bedrock at a depth of 40 to 60 inches, and Oquaga and Lordstown soils that do not have large stones on the surface. A few areas are very steep. The areas of included soils are as much as 3 acres each.

The seasonal high water table in these Oquaga and Lordstown soils is at a depth of more than 6 feet. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through both soils is moderate. Available water capacity is low in the Oquaga soils and moderate to low in the Lordstown soils. Runoff is rapid. In unlimed areas the surface layer is extremely acid to medium acid in the Oquaga soils and very strongly acid to slightly acid in the Lordstown soils.

Most areas of these soils are wooded. A few areas are used for pasture.

Slope and the stones on the surface limit the use of most types of farming equipment and make the soils generally unsuited to crops and poorly suited to pasture. Overgrazing when the soil is dry causes a loss of forage plants and increases the hazard of erosion.

The potential productivity for trees on these soils is moderately high. Slope and the stones on the surface limit the use of equipment, and the droughtiness of these soils causes a high rate of seedling mortality. Placing logging trails on the contour will help reduce the hazard of trailside gullying, and planting seedlings in early spring when the soil is moist reduces the mortality rate.

Slope, the stones on the surface, and the depth to bedrock are the major limitations of this soil for most types of community development.

The capability subclass is VIIs.

PhA—Phelps gravelly silt loam, 0 to 3 percent slopes. This soil is deep, nearly level, and moderately well drained. It is on terraces. The areas are long and narrow or oval and range from 5 to 20 acres.

Typically, the surface layer is dark grayish brown gravelly silt loam about 9 inches thick. The subsoil is mottled, brown and dark brown gravelly loam 23 inches thick. The substratum is very dark grayish brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are areas of Atherton, Wayland, and Red Hook soils. The areas of included soils make up about 15 percent of this map unit and are as much as 3 acres each.

The seasonal high water table in this Phelps soil is at a depth of 1-1/2 to 2 feet during the spring. The rate of water movement through the soil is moderate in the surface layer and subsoil and moderately rapid or rapid in the substratum. Available water capacity is moderate. Runoff is slow. Reaction in the surface layer is medium acid to neutral.

Most areas of this soil are used for crops and hay. Some areas are used for pasture.

This soil is suited to most crops grown in the county. Wetness early in the planting season is the main limitation. Drainage of wet included spots allows early tillage of some fields. Once this soil dries, it generally is easy to till, but gravel and small stone fragments interfere with some tillage and harvesting operations.

This soil is suitable for pasture, but grazing during wet periods compacts the soil surface and causes a loss of desirable forage species.

The potential productivity for trees on this soil is high. There are few limitations for woodland management.

The seasonal high water table and a frost-action potential are the major limitations of this soil for community

development. The moderately rapid or rapid rate of water movement through the substratum causes a hazard of ground-water pollution in areas used as sites for septic tank absorption fields.

The capability subclass is IIw.

PhB—Phelps gravelly silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is on low, undulating terraces, in shallow depressions, and along drainageways on higher terraces. The areas are irregular in shape and range from 5 to 25 acres.

Typically, the surface layer is dark grayish brown gravelly silt loam about 9 inches thick. The subsoil is a mottled, brown and dark brown gravelly loam 23 inches thick. The substratum is very dark grayish brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are areas of Atherton, Wayland, and Red Hook soils. The areas of included soils make up about 15 percent of this map unit and are as much as 3 acres each.

The seasonal high water table in this Phelps soil is at a depth of 1-1/2 to 2 feet during the spring. The rate of water movement through the soil is moderate in the surface layer and subsoil and moderately rapid or rapid in the substratum. Available water capacity is moderate. Runoff is slow to medium. Reaction in the surface layer is medium acid to neutral.

Most areas of this soil are used for crops and hay. Some areas are used for pasture.

This soil is suited to most crops grown in the county. Erosion is a moderate hazard, particularly on long slopes, and wetness early in the planting season is a limitation. Gravel and small stone fragments in the soil interfere with some tillage operations. This soil receives runoff from higher adjacent soils; the installation of interceptor drains will help to divert this runoff. Contour tillage, the use of cover crops, and conservation tillage help to reduce the erosion hazard, maintain tilth, and conserve moisture.

This soil is suitable for pasture, but grazing during wet periods causes compaction, which slows the infiltration rate and increases runoff and erosion. Compaction also destroys desirable forage plants.

The potential productivity for trees on this soil is high. Placing logging trails on the contour will help reduce the risk of trailside gullying.

The seasonal high water table and a frost-action potential are the major limitations of this soil for community development. The moderately rapid or rapid rate of water movement through the substratum causes a hazard of ground-water pollution in areas used as sites for septic tank absorption fields.

The capability subclass is IIe.

Pt—Pits, gravel and sand. This unit consists of areas from which sand and gravel have been removed for construction purposes. Generally, the sides of the pits are steep, and the floor is nearly level. Piles of cobblestones and boulders commonly are on the pit floor. The excavations mainly are irregular in shape and range from 2 to 40 acres. Small pools of water are on some pit floors.

Gravel and sand pits generally are devoid of vegetation, although some abandoned sites support a few trees, bushes, and grasses. The permeability of the unit is moderately rapid to very rapid, and the amount of water available to plants is very low.

The steep sides, rock fragments in the soil, and low available water capacity make this unit poorly suited to farming and cause low potential productivity for trees. The variability of the characteristics of this unit make onsite investigation necessary to determine the suitability of the unit for community development. The rapid permeability causes a hazard of ground-water pollution in areas used for waste disposal.

This unit is not assigned to a capability subclass.

Pu—Pits, quarry. This unit consists of excavations into bedrock used in construction. The sides of the excavations are steep, and the floor is nearly level. Piles of soil and unused quarry material are commonly on the pit floor and along the edges. The excavations mainly are irregular in shape and range from 2 to 40 acres. Small pools of water are on some pit floors.

Quarries generally are devoid of vegetation, but a few trees, bushes, and grasses are in the piled overburden in abandoned areas.

This unit generally is unsuitable for farming or woodland, but onsite investigation is needed to determine the potential of the unit for any use. Ground-water pollution is a hazard in areas used for waste disposal.

This unit is not assigned to a capability subclass.

Ra—Raynham silt loam. This soil is deep, nearly level, and somewhat poorly drained to poorly drained. It is in valleys. The areas are oblong and range from 5 to 20 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The subsoil is mottled, light brownish gray and grayish brown silt loam 30 inches thick. The substratum is mottled, dark brown and dark gray sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Canandaigua, Wayland, and Red Hook soils. Also included are a few gently sloping areas. The areas of included soils make up about 20 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Raynham soil is at a depth of 1/2 foot to 2 feet from late fall to late spring. The rate of water movement is moderate in the surface layer, moderately slow or moderate in the subsoil, and slow in the substratum. Available water capacity

is high. Runoff is slow. In unlimed areas reaction in the surface layer is strongly acid or very strongly acid.

Most areas of this soil are used for pasture. Some areas are in woodland.

This soil is poorly suited to most crops grown in the county. Seasonal wetness and poor tilth are the main limitations. With adequate drainage, this soil is suited to crops. Subsurface drains generally are effective if suitable outlets are available. Protective sleeves for tile are needed in some areas to prevent drains from being clogged with silt and very fine sand. Using cover crops and sod crops in the cropping system and conservation tillage will help to maintain tilth in drained and cultivated areas.

This soil is moderately suitable for pasture, but grazing when the soil is wet compacts the soil, resulting in the loss of desirable forage plants and ponding of water on the surface.

The potential productivity for trees on this soil is moderate. Seasonal wetness restricts the use of equipment, causes a high rate of seedling mortality, and restricts rooting, making trees susceptible to uprooting in windy periods.

The seasonal high water table and a potential frost action are the main limitations of the soil for community development.

The capability subclass is IIIw.

Re—Red Hook silt loam. This soil is deep, nearly level to gently sloping, and somewhat poorly drained. It is on the margins of alluvial fans and on low-lying terraces in valleys. The areas are long and narrow and range from 5 to 20 acres. Slopes range from 0 to 5 percent.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The subsoil is 18 inches thick. The upper 10 inches of the subsoil is friable, mottled, yellowish brown and light brownish gray silt loam. The lower 8 inches is mottled, grayish brown gravelly silt loam. The substratum extends to a depth of 60 inches or more. The upper part is grayish brown very gravelly loam, and the lower part is gravelly sandy loam.

Included with this soil in mapping are areas of Atherton soils. In a few places the surface layer is gravelly, and in a few spots the slope range is more than 5 percent. The areas of included soils make up about 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Red Hook soil is at a depth of 1/2 foot to 1-1/2 feet from late fall to late spring. The rate of water movement is moderate in the surface layer and subsoil and moderate or moderately slow in the substratum. Available water capacity is moderate. Runoff is slow. In unlimed areas reaction in the surface layer is strongly acid to slightly acid.

Most areas of this soil are in pasture.

Undrained areas of this soil are poorly suited to most crops grown in the county. Using drainage, mainly surface drainage, in areas with suitable outlets makes the soil well suited to crops. Conservation tillage and using cover crops and sod crops in the cropping system will help maintain tilth in drained and cultivated areas.

This soil is suitable for pasture, but grazing when the soil is wet compacts the soil, causing a loss of desirable forage plants and ponding of surface water.

The potential productivity for trees on this soil is moderate. Seasonal wetness limits the use of equipment, causes a high seedling mortality rate, and restricts rooting, making trees susceptible to uprooting during windy periods.

The seasonal high water table and a potential frost action are the main limitations of the soil for community development.

The capability subclass is IIIw.

RhB—Riverhead fine sandy loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is on undulating benches in valleys. The areas are oval and range from 5 to 20 acres.

Typically, the surface layer is dark brown fine sandy loam about 8 inches thick. The subsoil is dark brown and reddish brown fine sandy loam 20 inches thick. The substratum is dark brown sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of Castile soils and nearly level soils. The areas of included soils make up about 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Riverhead soil is at a depth of more than 6 feet. The rate of water movement is moderately rapid in the surface layer and subsoil and very rapid in the substratum. Available water capacity is low to moderate. Runoff is slow to medium. In unlimed areas the reaction of the surface layer is very strongly acid or strongly acid.

Most areas of this soil are used for vegetables or field crops. Some areas are used for alfalfa-hay.

This soil is well suited to most crops grown in the county. Droughtiness is a limitation in some years, mainly for shallow-rooted crops, and erosion is a hazard in intensively cultivated areas. Using cover crops and sod crops in the cropping system and conservation tillage will help to control erosion and improve the moisture storing capacity of the soil.

This soil is well suited to pasture. Overgrazing, particularly in dry years, causes a loss of desirable forage plants and increases the erosion hazard.

The potential productivity for trees on this soil is moderately high. Planting seedlings in early spring when the soil is moist increases the survival rate.

A frost-action potential and the instability of excavations in this soil are limitations for community development. The very rapid rate of water movement through the soil causes a hazard of ground-water pollution in areas used for septic tank absorption fields.

The capability subclass is IIs.

RhC—Riverhead fine sandy loam, 8 to 15 percent slopes. This soil is deep, sloping, and well drained. It is in valleys. The areas are oblong and range from 5 to 20 acres.

Typically, the surface layer is dark brown fine sandy loam about 8 inches thick. The subsoil is dark brown and reddish brown fine sandy loam 20 inches thick. The substratum is dark brown sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of Castile soils that make up about 10 percent of the unit and that are as much as 3 acres each.

The seasonal high water table in this Riverhead soil is at a depth of more than 6 feet. The rate of water movement is moderately rapid in the surface layer and subsoil and very rapid in the substratum. Available water capacity is low to moderate. Runoff is slow to medium. In unlimed areas the reaction of the surface layer is very strongly acid or strongly acid.

Most areas of this soil are used for field crops or alfalfa hay.

This soil is suited to most crops grown in the county. Erosion is a severe hazard in cultivated areas, and droughtiness is a limitation in some years, particularly for shallow-rooted crops. Contour tillage, using cover crops and sod crops in the cropping system, and conservation tillage will help to control erosion and improve the moisture storing capacity of the soil.

This soil is suitable for pasture. Overgrazing when the soil is dry causes a loss of desirable forage plants and increases the erosion hazard.

The potential productivity for trees on this soil is moderately high. Planting seedlings in spring when the soil is moist increases the survival rate. Placing logging trails on the contour helps to eliminate any hazard of trailside gullying.

Slope, a frost-action potential, and the instability of excavations in this soil are limitations for community development. The very rapid rate of water movement in the substratum causes a hazard of ground-water contamination in areas used for septic tank absorption fields.

The capability subclass is IIIe.

Sa—Saprists and Aquents, ponded. This unit consists of level, deep, very poorly drained soils mainly in low depressions. The majority of these areas are the result of beaver dams; some areas are adjacent to open bodies of water, such as lakes or ponds. These soils are covered with water for 6 months or more each year. The areas commonly are oval and range from 2 to 30 acres. Slopes range from 0 to 1 percent. Some areas consist mostly of Saprists, some mostly of Aquents, and some of both soils. Saprists typically are near the center of the unit, and Aquents are along the edges. The total acreage of this unit is about 50 percent Saprists, 40 percent Aquents, and 10 percent other soils.

Some Saprists consist of dark brown and very gray, well decomposed organic deposits about 20 inches thick over dark gray to dark brown silty clay loam to loamy sand. Bedrock is generally at a depth of more than 5 feet.

Some Aquents consist mostly of very dark gray to black organic matter about 5 inches thick. The underlying layer is dark gray to dark brown silt loam to sandy loam. Bedrock is generally at a depth of more than 5 feet.

Included with these soils in mapping are slightly higher areas of Canandaigua, Alden, Atherton, and Carlisle soils. The areas of included soils are as much as 1 acre each.

Cattails, sedges, and other water-tolerant plants cover most of the acreage of this unit; trees are on the edges of a few areas where the water is shallow. The water on the surface and in the soil, the instability of the soil, and the difficulty of using drainage limit the unit for most uses other than as wetland wildlife habitat.

The capability subclass is VIIIw.

ScA—Scio silt loam, 0 to 3 percent slopes. This soil is deep, nearly level, and moderately well drained. It is on old alluvial terraces in valleys. The areas are oblong and range from 5 to 50 acres.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsoil is yellowish brown and mottled, dark yellowish brown silt loam 33 inches thick. The substratum is brown and reddish brown very fine sandy loam and fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of soils that consist of shallow silt deposits over gravel and sand. Also included are Raynham and Canandaigua soils. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Scio soil is at a depth of 1-1/2 to 2 feet during spring. The rate of water movement through the soil is moderate in the surface layer and subsoil and moderately rapid or rapid in the substratum. Available water capacity is high. Runoff is slow. In unlimed areas reaction in the surface layer is very strongly acid to medium acid.

Most areas of this soil are used for crops and hay. Some other areas are used for pasture.

This soil is well suited to most crops grown in the county. Seasonal wetness early in the growing season sometimes delays tillage and planting. Compaction and the buildup of a plowpan are hazards in intensively cultivated areas. The use of cover crops and conservation tillage will help to prevent compaction and development of a plowpan. Subsurface drainage of included wet spots will allow early cultivation of many fields.

This soil is well suited to pasture. Grazing when the soil is wet compacts the surface layer, which results in plant loss and ponding of water on the surface.

The potential productivity for trees on this soil is high. There are few or no limitations for woodland management.

Seasonal wetness and a frost-action potential are the main limitations of this soil for community development. The moderately rapid to rapid rate of water movement in the substratum causes a hazard of ground-water pollution in areas used for septic tank absorption fields.

The capability subclass is IIw.

ScB—Scio silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is on old alluvial terraces in valleys. The areas are oblong and range from 5 to 90 acres.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsoil is yellowish brown and mottled, dark yellowish brown silt loam 33 inches thick. The substratum is brown and reddish brown very fine sandy loam and fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of soils that consist of shallow silt deposits over gravel and sand. Also included are Raynham and Canandaigua soils. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Scio soil is at a depth of 1-1/2 to 2 feet during spring. The rate of water movement through the soil is moderate in the surface layer and subsoil and moderately rapid or rapid in the substratum. Available water capacity is high. Runoff is medium. In unlimed areas reaction in the surface layer is very strongly acid to medium acid.

Most areas of this soil are used for crops and hay. Some other areas are used for pasture.

This soil is well suited to most crops grown in the county. Erosion is a hazard, particularly on long slopes, and seasonal wetness early in the growing season is a limitation for early tillage and planting. Compaction and the buildup of a plowpan are hazards in cultivated areas. Contour tillage, the use of cover crops and sod crops in the cropping system, and conservation tillage are practices that will help control erosion and reduce compaction and development of a plowpan.

This soil is well suited to pasture. Grazing when the soil is wet compacts the surface layer, which results in plant loss and a higher rate of runoff and erosion.

The potential productivity for trees on this soil is high. Placing logging roads on the contour will help eliminate any hazard of trailside gullying.

Seasonal wetness and a frost-action potential are the main limitations of this soil for community development. The moderately rapid to rapid rate of water movement in the substratum causes a hazard of ground-water pollution in areas used for septic tank absorption fields.

The capability subclass is IIe.

Te—Teel silt loam, moderately well drained. This soil is deep and nearly level. It is on flood plains along streams and rivers. The areas are long and narrow or irregular in shape and range from 5 to 40 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsoil is dark yellowish brown and mottled, brown and dark grayish brown silt loam 30 inches thick. The substratum is mottled, dark brown silt loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Wayland soils and somewhat poorly drained Teel soils. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Teel soil is at a depth of 1-1/2 to 2 feet from midwinter to midspring. The rate of water movement through the soil is moderate. Runoff is slow. Available water capacity is high. In unlimed areas the surface layer is strongly acid to neutral.

Most areas of this soil are used for crops or pasture and hay.

This soil is well suited to most crops grown in the county. Flooding or seasonal wetness limits early planting in some years, and streambank erosion is a hazard in some areas (fig. 8). The use of cover crops and sod crops in the cropping system, the use of crop residue, and conservation tillage will help to maintain tilth and reduce the hazard of scouring from flooding.

Figure 8.—Flooding on an area of Teel silt loam, moderately well drained, near the Chenango River.

This soil is suitable for pasture, but grazing when the soil is wet compacts the soil and results in the loss of desirable forage plants. Fencing streambanks protects against destruction of the plant cover and helps to control streambank erosion.

The potential productivity for trees on this soil is high. There are few limitations for woodland management.

Flooding, the seasonal high water table, and a potential frost action are the main limitations of the soil for community development.

The capability subclass is IIw.

Th—Teel silt loam, somewhat poorly drained. This soil is deep and nearly level. It is along streams and rivers where flooding occurs. The areas are long and narrow or irregular in shape and range from 5 to 40 acres. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The subsoil is dark yellowish brown and mottled, brown and dark grayish brown silt loam 30 inches thick. The substratum is mottled, dark brown silt loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Wayland soils in slackwater areas and along shallow drainageways, Raynham soils on slightly higher terraces that are not subject to flooding, and moderately well drained Teel soils on islandlike benches and rises. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Teel soil is at a depth of 1/2 foot to 1-1/2 feet from midwinter to midspring. The rate of water movement through the soil is moderate. Runoff is slow or very slow. Available water capacity is high. In unlimed areas the surface layer is strongly acid to neutral.

Most areas of this soil are used for hay or pasture. Some areas are used for cultivated crops.

Drained areas of this soil are moderately suited to most crops grown in the county, but drainage outlets generally are difficult to locate. In undrained areas, seasonal wetness delays planting and tillage until late spring and hinders harvesting in late fall. In some years flooding delays cultivation or injures crops during the growing season. The use of cover crops and sod crops in the cropping system, the use of crop residue, and conservation tillage will help to maintain tilth, reduce the hazard of scouring from flooding, and prevent streambank erosion.

This soil is suitable for pasture, but grazing when the soil is wet compacts the soil and results in the loss of desirable forage plants and ponding of water on the surface. Fencing streambanks to protect the plant cover prevents increased streambank erosion.

The potential productivity for trees on this soil is moderately high. Seasonal wetness limits equipment use, causes a high seedling mortality rate, and restricts rooting, making trees susceptible to uprooting during windy periods.

Flooding, the seasonal high water table, and a potential frost action are the main limitations of the soil for community development.

The capability subclass is IIIw.

Tr—Trestle silt loam. This soil is deep, nearly level, and well drained to somewhat excessively drained. It is along streams in small valleys. The areas are long and narrow and range from 5 to 50 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is brown gravelly silt loam and gravelly loam 13 inches thick. The substratum is dark reddish brown very gravelly coarse sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Castile, Red Hook, Atherton, and Scio soils. The areas of included soils make up about 15 percent of the unit and are as much as 3 acres each.

The seasonal high water table in this Trestle soil is at a depth of 3 to 6 feet. Flooding sometimes occurs but is rare. The rate of water movement is moderate in the surface layer, moderate or moderately rapid in the subsoil, and rapid in the substratum. Available water capacity is low to moderate. Runoff is slow. In unlimed areas reaction of the surface layer is strongly acid or medium acid.

Most areas of this soil are used for cultivated crops or alfalfa-hay. Some areas are used for pasture.

This soil is well suited to most crops grown in the county. Droughtiness is a limitation during dry periods, particularly for shallow-rooted crops. Gravel in the subsoil interferes with planting, cultivation, and harvesting of some crops and causes rapid wear of some machinery. The use of cover crops and sod crops in the cropping system and conservation tillage will help to maintain tilth and improve the moisture storing capacity of the soil. Flooding of this soil generally does not occur during the growing season.

This soil is well suited to pasture, but overgrazing during droughty periods causes a loss of desirable forage plants.

The potential productivity for trees on this soil is high. Planting seedlings when the soil is moist in early spring will help increase the survival rate.

The hazard of flooding and rapid rate of water movement in the substratum are limitations of the soil for community development. The rate of water movement causes a hazard of ground-water pollution in areas used for septic tank absorption fields. Flooding generally occurs when water is backed up by ice or debris downstream.

The capability class is I.

Tu—Tuller channery silt loam. This soil is shallow, nearly level, and somewhat poorly drained and poorly drained. It is on ridgetops and hilltops and in concave

areas on benched side slopes. The areas are long and narrow and range from 3 to 20 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is very dark grayish brown channery silt loam about 8 inches thick. The subsoil is mottled, dark grayish brown and grayish brown channery silt loam 9 inches thick. Hard sandstone bedrock is at a depth of 17 inches.

Included with this soil in mapping are areas of Greene, Norwich, and Chippewa soils. The areas of included soils make up about 10 percent of this unit and are as much as 3 acres each.

The depth to bedrock in this Tuller soil is 10 to 20 inches. A seasonal high water table is at a depth of 1/2 foot to 1 foot from late fall to early summer. The rate of water movement through this soil is moderate in the surface layer and slow or moderately slow in the subsoil. Runoff is slow. Available water capacity is very low or low. In unlimed areas reaction in the surface layer is extremely acid to medium acid.

Most areas of this soil are in woodland. A few areas are used for pasture.

The depth to bedrock and seasonal wetness make this soil poorly suited to most crops grown in the county. Drainage is difficult to install because of the underlying bedrock. Partially drained areas are suitable for hay, particularly if the forage plants are species that withstand soil wetness in the spring.

The seasonal high water table in the spring makes this soil poorly suited to pasture. Grazing when the soil is wet compacts the surface layer, which results in the loss of desirable forage plants.

The potential productivity for trees on this soil is low. Seasonal wetness restricts the use of equipment and causes a high rate of seedling mortality. The depth to bedrock and seasonal wetness restrict rooting and cause a hazard of uprooting during windy periods.

Seasonal wetness and the depth to bedrock are major limitations of this soil for community development or recreation.

The capability subclass is IVw.

Ud—Udifluvents-Fluvaquents complex, frequently flooded. This unit consists of deep, nearly level and gently sloping soils on flood plains. Frequent flooding of these soils often results in the shifting of soil material from place to place. Most areas are long and narrow and are dissected by old stream channels. The areas commonly range from 5 to 40 acres, but some are as large as 75 acres. Slopes range from 0 to 5 percent. This unit consists of about 50 percent somewhat excessively drained to moderately well drained Udifluvents, 40 percent somewhat poorly drained to very poorly drained Fluvaquents, and 10 percent other soils. The Udifluvents and Fluvaquents are so intermingled that it was not practical to map them separately.

Udifluvents generally have a brownish, loamy surface layer. The substratum is brownish. It is loamy in the upper part and stratified sand and gravel in the lower part.

Fluvaquents generally have a dark gray, loamy surface layer and a mottled, gray, loamy substratum.

Included with this unit in mapping are areas, mostly of Hamlin, Teel, and Wayland soils, that are not flooded frequently. In a few places are Chenango soils on alluvial fans and silt-capped, very gravelly Trestle soils. Some areas consist of sand or gravel with little or no loamy material. The areas of included soils are as large as 2 acres.

The variability of the characteristics of this unit and the frequency of flooding are major limitations for most uses other than wetland wildlife habitat. Some areas provide poor-quality pasture, but grazing near streambanks increases erosion in those areas.

The capability subclass is Vw.

Ue—Udorthents, smoothed. This unit consists of areas in which the original soil material has been removed or has been covered with other soil material at least 3 feet thick. These areas consist of construction projects, such as highways and shopping centers, and previously used landfills or those currently used as landfills. Some older areas of the unit are covered with bushes and grasses, but most of the areas have no plant cover. The soil material in these areas generally is well mixed and commonly is brownish and loamy. Slopes range from 0 to 5 percent. A few small quarries and gravel and sand pits are in the unit.

The variability of the characteristics of this unit make onsite investigation necessary to determine the potential of the unit for any use.

This unit is not assigned to a capability subclass.

UnA—Unadilla silt loam, 0 to 3 percent slopes. This soil is deep, nearly level, and well drained. It is on benches along lower valley sides in major stream valleys. The areas are oblong and range from 5 to 40 acres.

Typically, the surface layer of this soil is dark brown silt loam about 11 inches thick. The subsoil is yellowish brown and dark yellowish brown silt loam 25 inches thick. The substratum extends to a depth of 60 inches or more. It is dark yellowish brown very fine sandy loam in the upper part and yellowish brown sandy loam in the lower part.

Included with this soil in mapping are areas of Scio, Raynham, Canandaigua, and Canaseraga soils. The areas of included soils make up about 15 percent of the unit and are as much as 3 acres each.

The seasonal high water table in this Unadilla soil is at a depth of more than 6 feet. The rate of water movement through the soil is moderate in the surface layer, subsoil, and upper part of the substratum and moderate-

ly rapid or rapid in the lower part of the substratum. Runoff is slow. Available water capacity is high. Flooding occurs rarely for very brief periods during unusually intense storms or under conditions of abnormally high runoff. In unlimed areas reaction of the surface layer is very strongly acid to slightly acid.

Most areas of this soil are used for hay and cultivated crops. Some areas are in pasture or woodland, and a few areas are used for recreation and community development.

This soil is well suited to most crops grown in the county, particularly to potatoes and other row crops. The use of cover crops and sod crops in the cropping system and the use of crop residue are practices that maintain tilth.

This soil is suitable for pasture, but overgrazing and grazing when the surface layer is wet cause a loss of desirable forage plants and compaction of the surface layer.

The potential productivity for trees on this soil is high. Planting seedlings in the spring when the soil is moist increases the survival rate.

Low strength and a frost-action potential are the main limitations of this soil for community development. Although rare, flooding nevertheless is a limitation of the soil as a site for homes.

The capability class is I.

UnB—Unadilla silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is on benches in major valleys. The areas are oblong and range from 5 to 40 acres.

Typically, the surface layer of this soil is dark brown silt loam about 11 inches thick. The subsoil is yellowish brown and dark yellowish brown silt loam 25 inches thick. The substratum extends to a depth of 60 inches or more. It is dark yellowish brown very fine sandy loam in the upper part and yellowish brown sandy loam in the lower part.

Included with this soil in mapping are areas of Scio, Raynham, Canandaigua, and Canaseraga soils. The areas of included soils make up about 10 percent of the unit and are as much as 3 acres each.

The seasonal high water table in this Unadilla soil is at a depth of more than 6 feet. The rate of water movement through the soil is moderate in the surface layer, subsoil, and upper part of the substratum and moderately rapid or rapid in the lower part of the substratum. Runoff is slow to medium. Available water capacity is high. Flooding occurs rarely for very brief periods during unusually intense storms or under conditions of abnormally high runoff. In unlimed areas reaction of the surface layer is very strongly acid to slightly acid.

Most areas of this soil are used for hay and cultivated crops. Some areas are in pasture or woodland. A few areas are used for community development and recreation.

This soil is well suited to most crops grown in the county, particularly to potatoes and other crops that are suited to an acid soil. Erosion is a slight hazard, particularly on long slopes. Contour tillage, the use of cover crops and sod crops in the cropping system, and the use of crop residue will help to control erosion and maintain tilth.

This soil is suitable for pasture, but grazing before the sod cover is established or when the surface layer is wet causes soil compaction and a loss of desirable forage plants, resulting in further erosion.

The potential productivity for trees on this soil is high. Planting seedlings in the spring when the soil is moist increases the survival rate.

Low strength and a frost-action potential are the main limitations of this soil for community development. Although rare, flooding nevertheless is a limitation of the soil as a site for homes.

The capability subclass is IIe.

VaB—Valois gravelly silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and well drained. It is on knolls and along lower valley sides. The areas are oblong and range from 10 to 20 acres.

Typically, this soil has a surface layer of dark brown gravelly silt loam about 9 inches thick. The subsurface layer is grayish brown gravelly silt loam 5 inches thick. The subsoil is yellowish brown gravelly silt loam 26 inches thick. The substratum is dark yellowish brown very gravelly sandy loam to a a depth of 60 inches or more.

Included with this soil in mapping are areas of Bath, Mardin, and Chenango soils. The areas of included soils make up 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Valois soil is at a depth of more than 6 feet. The rate of water movement through the soil is moderate in the surface layer, subsurface layer, and subsoil and is moderate or moderately rapid in the substratum. Available water capacity is moderate. Runoff is slow to medium. In unlimed areas reaction in the surface layer is very strongly acid to medium acid.

Most areas of this soil are used for cultivated crops or alfalfa-hay. Some areas are used for pasture.

This soil is well suited to most cultivated crops grown in the county. Long slopes are susceptible to erosion in cultivated areas, and droughtiness is a limitation for shallow-rooted crops in some years. The use of cover crops and sod crops in the cropping system, contour tillage, and the use of crop residue help to control erosion and improve the water holding capacity of the soil. Gravel in the soil interferes with some tillage and harvesting operations.

This soil is well suited to pasture. Grazing during dry periods causes a loss of desirable forage plants, which increases the hazard of erosion.

The potential productivity for trees on this soil is moderately high. Planting seedlings in the spring when the soil is moist will help to increase the survival rate.

This soil has no major limitations for community development, but the gravel in the soil hinders the establishment of lawns and shrubs, and the slope limits some uses.

The capability subclass is IIe.

VaC—Valois gravelly silt loam, 8 to 15 percent slopes. This soil is deep, sloping, and well drained. It is on knolls and low hills along lower valley sides. The areas are oblong and range from 10 to 50 acres.

Typically, this soil has a surface layer of dark brown gravelly silt loam about 9 inches thick. The subsurface layer is grayish brown gravelly silt loam 5 inches thick. The subsoil is yellowish brown gravelly silt loam 26 inches thick. The substratum is dark yellowish brown very gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Bath, Mardin, and Chenango soils. The areas of included soils make up 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Valois soil is at a depth of more than 6 feet. The rate of water movement through the soil is moderate in the surface layer, subsurface layer, and subsoil and is moderate or moderately rapid in the substratum. Available water capacity is moderate. Runoff is medium. In unlimed areas reaction in the surface layer is very strongly acid to medium acid.

Most areas of this soil are used for cultivated crops or alfalfa-hay. Some areas are used for pasture.

This soil is well suited to most crops grown in the county. Erosion is a severe hazard, particularly on long slopes and in intensively cultivated areas, and droughtiness is a limitation for shallow-rooted crops in some years. The use of cover crops and sod crops in the cropping system, contour tillage, stripcropping, and the use of crop residue are practices that help to control erosion and improve the water holding capacity of the soil. Gravel in the soil interferes with some tillage and harvesting operations.

This soil is well suited to pasture. Grazing during dry periods causes a loss of desirable forage plants, which increases the hazard of erosion.

The potential productivity for trees on this soil is moderately high. Placing logging trails on the contour will reduce any hazard of trailside erosion. Planting seedlings in the spring when the soil is moist helps to increase the survival rate.

Slope and a potential frost-action are the main limitations of this soil for community development.

The capability subclass is IIIe.

VaD—Valois gravelly silt loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is on side slopes and hilly areas along lower valley sides. The areas are oblong and range from 10 to 50 acres.

Typically, this soil has a surface layer of dark brown gravelly silt loam about 9 inches thick. The subsurface layer is grayish brown gravelly silt loam 5 inches thick. The subsoil is yellowish brown gravelly silt loam 26 inches thick. The substratum is dark yellowish brown very gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Bath, Mardin, and Chenango soils. The areas of included soils make up 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Valois soil is at a depth of more than 6 feet. The rate of water movement through the soil is moderate in the surface layer, subsurface layer, and subsoil and is moderate or moderately rapid in the substratum. Available water capacity is moderate. Runoff is rapid. In unlimed areas reaction in the surface layer is very strongly acid to medium acid.

Most areas of this soil are used for pasture or alfalfa-hay or are in woodland.

Slope makes this soil poorly suited to most crops grown in the county. Erosion is a severe hazard, particularly on long slopes and in intensively cultivated areas, and droughtiness is a limitation for shallow-rooted crops. The use of cover crops and sod crops in the cropping system, contour tillage, stripcropping, and the use of crop residue are practices in cultivated areas that help to control erosion and improve the water holding capacity of the soil. Gravel in the soil interferes with some tillage and harvesting operations, and slope limits the use of equipment.

This soil is suitable for pasture. Grazing during droughty periods causes a loss of desirable forage plants and increases the erosion hazard.

The potential productivity for trees on this soil is moderately high. Slope limits the use of planting and harvesting equipment. Placing logging trails on the contour will help to eliminate trailside gullying, and planting seedlings in the spring when the soil is moist helps to increase the survival rate.

Slope is the main limitation of this soil for community development. A frost-action potential is a limitation for some uses.

The capability subclass is IVe.

VaE—Valois gravelly silt loam, 25 to 35 percent slopes. This soil is deep, steep, and well drained. It is along lower valley sides. The areas are oblong and range from 10 to 50 acres.

Typically, this soil has a surface layer of dark brown gravelly silt loam about 9 inches thick. The subsurface layer is grayish brown gravelly silt loam 5 inches thick. The subsoil is yellowish brown gravelly silt loam 26 inches thick. The substratum is dark yellowish brown

very gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Bath and Mardin soils. The areas of included soils make up about 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Valois soil is at a depth of more than 6 feet. The rate of water movement through the soil is moderate in the surface layer, subsurface layer, and subsoil and is moderate or moderately rapid in the substratum. Available water capacity is moderate. Runoff is rapid to very rapid. In unlimed areas reaction in the surface layer is very strongly acid to medium acid.

Slope makes this soil poorly suited to most crops grown in the county and limits the use of tillage and harvesting equipment. Droughtiness and the gravel in the soil are additional limitations for farming.

This soil is moderately suitable for pasture. Grazing during droughty periods causes a loss of desirable forage plants and increases the erosion hazard. Slope limits the operation of equipment for reseeding and applying lime and fertilizer.

The potential productivity for trees on this soil is moderately high, and most areas are wooded. Slope is a limitation for planting and timber-harvesting equipment. Erosion is a hazard along logging trails. Planting seedlings in the spring when the soil is moist will help increase the survival rate.

Slope is the main limitation of this soil for community development. A frost-action potential is a limitation for some uses.

The capability subclass is VIe.

VaF—Valois gravelly silt loam, 35 to 50 percent slopes. This soil is deep, very steep, and well drained. It is on valley sides. The areas are oblong and range from 10 to 50 acres.

Typically, this soil has a surface layer of dark brown gravelly silt loam about 9 inches thick. The subsurface layer is grayish brown gravelly silt loam 5 inches thick. The subsoil is yellowish brown gravelly silt loam 26 inches thick. The substratum is dark yellowish brown very gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Bath soils that make up about 10 percent of this unit and that are as much as 3 acres each.

The seasonal high water table in this Valois soil is at a depth of more than 6 feet. The rate of water movement through the soil is moderate in the surface layer, subsurface layer, and subsoil and is moderate or moderately rapid in the substratum. Available water capacity is moderate. Runoff is very rapid. In unlimed areas reaction in the surface layer is very strongly acid to medium acid.

Slope makes this soil generally unsuited to most crops grown in the county and poorly suited to pasture. The slope limits the use of most types of farm equipment and limits reseeding and the application of lime and fertilizer.

The potential productivity for trees on this soil is moderately high, and most areas are wooded. Slope is a limitation for planting and timber-harvesting equipment. Erosion is a hazard along logging trails. Planting seedlings in the spring when the soil is moist will help increase the survival rate.

Slope is the main limitation of this soil for community development. A frost-action potential is a limitation for some uses.

The capability subclass is VIIe.

VoA—Volusia channery silt loam, 0 to 3 percent slopes. This soil is deep, nearly level, and somewhat poorly drained. It is on foot slopes of hills, on broad hilltops, and along drainageways. The areas are oblong and range from 5 to 50 acres.

Typically, the surface layer is dark brown channery silt loam about 10 inches thick. The subsurface layer is mottled, grayish brown channery silt loam 5 inches thick. The subsoil is a very firm layer of mottled, brown and grayish brown channery silt loam and channery loam 33 inches thick. The substratum is firm, grayish brown very channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Chippewa, Alden, Tuller, and Greene soils. Also included are areas with a flaggy or stony surface layer. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Volusia soil is at a depth of 1/2 foot to 1-1/2 feet from late fall to late spring. The rate of water movement through the soil is moderate above the subsoil and slow or very slow in the subsoil and substratum. Available water capacity is low. Runoff is slow. In unlimed areas reaction in the surface layer is very strongly acid to slightly acid.

Most areas of this soil are used for pasture or are in woodland. Some areas are used for hay, and some drained areas are in cultivated crops.

Drained areas of this soil are moderately suited to most crops grown in the county. Wetness limits early-season tillage and often prevents harvest in the fall, and rock fragments in the soil hinder some tillage operations. Droughtiness is a limitation for crops in some years. The use of cover crops and sod crops in the cropping system and the use of crop residue will help to maintain tilth in drained and cultivated areas.

This soil is suitable for pasture, but grazing when the soil is wet compacts the surface layer, resulting in forage plant loss and ponding of water on the surface.

The potential productivity for trees on this soil is moderately high. Seasonal wetness limits the use of equipment, restricts rooting, and causes a high rate of seedling mortality. The restricted rooting depth makes trees susceptible to uprooting during windy periods.

Seasonal wetness, a frost-action potential, and the slow or very slow rate of water movement in the subsoil are the main limitations of this soil for community development.

The capability subclass is IIIw.

VoB—Volusia channery silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and somewhat poorly drained. It is on foot slopes of hills, on broad hilltops, and along drainageways. The areas are oblong and range from 5 to 50 acres.

Typically, the surface layer is dark brown channery silt loam about 10 inches thick. The subsurface layer is mottled, grayish brown channery silt loam 5 inches thick. The subsoil is a very firm layer of mottled, brown and grayish brown channery silt loam and channery loam 33 inches thick. The substratum is firm, grayish brown very channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Chippewa, Alden, Tuller, and Greene soils. Also included are areas with a flaggy or stony surface layer. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Volusia soil is at a depth of 1/2 foot to 1-1/2 feet from late fall to late spring. The rate of water movement through the soil is moderate above the subsoil and slow or very slow in the subsoil and substratum. Available water capacity is low. Runoff is slow to medium. In unlimed areas reaction in the surface layer is very strongly acid to slightly acid.

Most areas of this soil are used for pasture or are in woodland. Some areas are used for hay, and some drained areas are in cultivated crops.

Drained areas of this soil are moderately suited to most crops grown in the county. Wetness limits early-season tillage and often prevents harvest in the fall. Rock fragments in the soil hinder some tillage operations, and erosion is a hazard on long slopes. Droughtiness is a limitation for crops in some years. The use of cover crops and sod crops in the cropping system, the use of crop residue, and contour tillage will help to maintain tilth and control the erosion hazard.

This soil is suitable for pasture, but grazing when the soil is wet compacts the surface layer, resulting in forage plant loss and ponding of water on the surface.

The potential productivity for trees on this soil is moderately high. Seasonal wetness limits the use of equipment, restricts rooting, and causes a high rate of seedling mortality. The restricted rooting depth makes trees susceptible to uprooting during windy periods.

Seasonal wetness, a frost-action potential, and the slow or very slow rate of water movement in the subsoil are the main limitations of this soil for community development.

The capability subclass is IIIw.

VoC—Volusia channery silt loam, 8 to 15 percent slopes. This soil is deep, sloping, and somewhat poorly drained. It is on foot slopes of hills, on the lower parts of long side slopes, and along drainageways. The areas are oblong and range from 5 to 100 acres.

Typically, the surface layer is dark brown channery silt loam about 10 inches thick. The subsurface layer is mottled, grayish brown channery silt loam 5 inches thick. The subsoil is a very firm layer of mottled, brown and grayish brown channery silt loam and channery loam 33 inches thick. The substratum is firm, grayish brown very channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Chippewa, Alden, Tuller, and Greene soils. Also included are areas with a flaggy or stony surface layer. The areas of included soils make up about 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Volusia soil is at a depth of 1/2 foot to 1-1/2 feet from late fall to late spring. The rate of water movement through the soil is moderate above the subsoil and slow or very slow in the subsoil and substratum. Available water capacity is low. Runoff is medium to rapid. In unlimed areas reaction in the surface layer is very strongly acid to slightly acid.

Most areas of this soil are used for pasture or are in woodland. Some areas are used for hay.

Drained areas of this soil are suited to most crops grown in the county, especially if interceptor drains are used to divert runoff from higher adjacent soils. Wetness limits early-season tillage and often prevents harvest in the fall. Erosion is a major hazard, particularly on long slopes and in intensively cultivated areas. Rock fragments in the soil limit some tillage operations, and droughtiness is a limitation for some crops. The use of cover crops and sod crops in the cropping system, the use of crop residue, contour tillage, and stripcropping will help to control erosion and maintain tilth in drained and cultivated acres.

This soil is suitable for pasture, but grazing when the soil is wet compacts the surface layer, which results in forage plant loss, ponding of surface water, and increased erosion.

The potential productivity for trees on this soil is moderately high. Seasonal wetness limits the use of equipment, restricts rooting, and causes a high rate of seedling mortality. The restricted rooting depth makes trees susceptible to uprooting during windy periods. Placing logging trails on the contour will help eliminate the hazard of trailside erosion.

Slope, seasonal wetness, a frost-action potential, and the slow or very slow rate of water movement in the subsoil are the main limitations of this soil for community development.

The capability subclass is IIIe.

VpB—Volusia and Morris very stony silt loams, 3 to 10 percent slopes. This unit consists of deep, gently

sloping to sloping, somewhat poorly drained soils on broad hilltops, in low areas and seep areas, on foot slopes, and along drainageways. The areas of these soils are oblong and range from 5 to 40 acres. Stones and boulders at least 10 inches in diameter are about 5 to 30 feet apart on the surface. Some areas consist mostly of Volusia soils, some mostly of Morris soils, and some of both. These soils were mapped together because they have no major differences in use and management. The total acreage of this unit is about 65 percent Volusia soils, 20 percent Morris soils, and 15 percent other soils.

Typically, the Volusia soils have a surface layer of dark brown channery silt loam about 10 inches thick. The subsurface layer is mottled, grayish brown channery silt loam 5 inches thick. The subsoil is a very firm layer of mottled, brown and grayish brown channery silt loam 33 inches thick. The substratum is firm, grayish brown channery silt loam to a depth of 60 inches or more.

Typically, the Morris soils have a surface layer of dark grayish brown channery silt loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 12 inches of the subsoil is mottled, grayish brown channery silt loam. The lower part of the subsoil is a firm layer of mottled, reddish brown channery silt loam.

Included with these soils in mapping are areas of Norwich, Chippewa, Alden, Oquaga, Lordstown, Arnot, Tuller, and Greene soils. Some small areas have bedrock at a depth of 40 to 60 inches, and some areas do not have large stones on the surface. The included areas are as much as 3 acres each.

The seasonal high water table in these Volusia and Morris soils is perched at a depth of 1/2 foot to 1-1/2 feet from late fall to late spring. The rate of water movement through the soils is moderate above the subsoil and slow or very slow in the subsoil. Runoff is slow to medium, and available water capacity is low. Reaction of the surface layer is very strongly acid to slightly acid in the Volusia soils and very strongly acid to medium acid in the Morris soils.

Most areas of this unit are wooded. Some areas are used for pasture.

The stones on the surface and seasonal wetness make these soils generally unsuited to most crops grown in the county and poorly suited to permanent pasture (fig. 9). Grazing when these soils are wet causes surface compaction and loss of desirable forage plants. The stones on the surface limit reseeding and the application of lime and fertilizer.

The potential productivity for trees on these soils is moderately high. The stones on the surface and seasonal wetness are the main limitations. They limit the use of equipment and cause a high rate of seedling mortality. A shallow rooting depth makes trees susceptible to uprooting during windy periods.

Slope, seasonal wetness, the stones on the surface, a frost-action potential, and the slow or very slow rate of water movement through the subsoil are the main limitations of these soils for community development.

The capability subclass is VIIs.

Wa—Wayland silt loam. This soil is deep, nearly level, and poorly drained and very poorly drained. It is in low areas close to streams and rivers where flooding is frequent. The areas are oblong and range from 3 to 35 acres.

Typically, the surface layer is dark gray silt loam about 9 inches thick. The subsoil is mottled, grayish brown silt loam 12 inches thick. The substratum is mottled, gray and grayish brown silt loam to a depth of 60 inches or more.

Included with this soil in mapping are oblong areas of sand and gravel and areas that have a mucky surface layer less than 16 inches thick. Atherton, Canandaigua, and Raynham soils are in a few places. The areas of included soils make up about 15 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Wayland soil is between the surface and a depth of 1/2 foot from midfall to early summer. The rate of water movement through the soil is moderately slow to moderate in the surface layer and slow in the subsoil and substratum. Flooding is frequent and generally occurs in the period from November through June. Available water capacity is high. Runoff is slow. In unlimed areas the surface layer is strongly acid to neutral.

Most areas of this soil are in brush. A few areas are used for pasture.

Undrained areas of this soil are generally unsuitable for hay or most crops grown in the county, and outlets for drainage commonly are not available. Flooding is a hazard during the growing season. Using cover crops and sod crops in the cropping system and using crop residue will help to maintain tilth and reduce flood scouring in areas used for crops.

This soil is moderately suitable for pasture, but generally at least partial drainage is required for pastures. Grazing when the soil is wet causes trampling of forage grasses and soil compaction.

The potential productivity for trees on this soil is moderate. Seasonal wetness limits the use of equipment, causes a high rate of seedling mortality, and restricts rooting, making trees susceptible to uprooting during windy periods.

Frequent flooding, the prolonged high water table, and a high frost-action potential are major limitations of this soil for community development.

The capability subclass is Vw.

WeB—Wellsboro channery silt loam, 3 to 8 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is on the foot slopes of hills and on broad

Figure 9.—An area of Volusia and Morris very stony silt loams, 3 to 10 percent slopes.

hilltops on uplands. The areas are oblong and range from 5 to 20 acres.

Typically, the surface layer is dark brown channery loam about 8 inches thick. The subsoil is 50 inches thick. The upper 10 inches of the subsoil is reddish brown channery silt loam. The lower 40 inches is a firm layer of mottled, reddish brown channery silt loam. The substratum is firm, reddish brown channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Morris, Volusia, Norwich, and Chippewa soils. Also included are areas that have stones on the surface. The areas of included soils make up about 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Wellsboro soil is at a depth of 1-1/2 to 3 feet from midfall to early summer. The rate of water movement through the soil is moderate in the surface layer and upper part of the subsoil and slow in the lower part of the subsoil and in the substratum. Available water capacity is moderate. Runoff is medium. In unlimed areas the reaction in the surface layer is very strongly acid to medium.

Most areas of this soil are used for hay and corn. Some areas are used for pasture or are in woodland.

This soil is suited to most crops grown in the county. Temporary wetness early in the planting season is a limitation for early-season crops. Drainage of included wet spots allows earlier tillage of many fields. Rock fragments and small stones in the soil interfere with some tillage operations, and erosion is a hazard on long slopes. The use of sod crops and cover crops in the cropping system and cross-slope tillage will help to control the erosion hazard.

This soil is suitable for pasture, but grazing when the soil is wet compacts the surface layer and results in the loss of desirable forage plants and increased erosion.

The potential productivity for trees on this soil is high. There are few or no limitations for woodland management.

Seasonal wetness, the slow rate of water movement through the lower part of the subsoil, and a high potential frost action are the main limitations of the soil for community development.

The capability subclass is IIw.

WeC—Wellsboro channery silt loam, 8 to 15 percent slopes. This soil is deep, sloping, and moderately well drained. It is on the lower parts of hillsides and on hilltops on uplands. The areas are oblong and range from 5 to 20 acres.

Typically, the surface layer is dark brown channery loam about 8 inches thick. The subsoil is 50 inches thick. The upper 10 inches of the subsoil is reddish brown channery silt loam. The lower 40 inches is a firm layer of mottled, reddish brown channery silt loam. The substratum is firm, reddish brown channery silt loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Morris, Volusia, Norwich, and Chippewa soils. Also included are areas that have stones on the surface. The areas of included soils make up about 10 percent of this unit and are as much as 3 acres each.

The seasonal high water table in this Wellsboro soil is at a depth of 1-1/2 to 3 feet from midfall to early summer. The rate of water movement through the soil is moderate in the surface layer and upper part of the subsoil and slow in the lower part of the subsoil and in the substratum. Available water capacity is moderate. Runoff is medium to rapid. In unlimed areas the reaction in the surface layer is very strongly acid to medium acid.

Some areas of this soil are used for hay and cultivated crops. A few areas are in pasture or woodland.

This soil is suited to most crops grown in the county. Erosion is a hazard that can be controlled by stripcropping, cross-slope tillage, using sod crops and cover crops in the cropping system, and using tillage systems that keep most of the crop residue on the surface. Seasonal wetness delays planting in some years and is a hazard to early-season crops. Rock fragments and small stones in the soil interfere with some tillage operations.

This soil is suitable for pasture, but grazing when the soil is wet compacts the surface layer and results in the loss of desirable forage plants and increased erosion.

The potential productivity for trees on this soil is high. There are few or no limitations for woodland management.

Seasonal wetness, slope, a high frost-action potential, and the slow rate of water movement through the lower part of the subsoil are the main limitations of this soil for community development.

The capability subclass is IIIe.

Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the use of our Nation's prime farmland with wisdom and foresight.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yield of crops when it is treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may now be in crops, pasture, woodland, or other land, but not urban or built-up land or water areas. It must either be used for producing food or fiber or be available for these uses.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It also has a favorable temperature and growing season and acceptable levels of acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not flooded during the growing season. The slope range is mainly from 0 to 6 percent. For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

About 102,483 acres, or nearly 18 percent of Chenango County, meets the soil requirements for prime farmland. The areas are throughout the county, but many are in the major valleys. The major crops grown on this land are corn, small grains, hay, vegetables, and nursery stock.

The soil map units that make up prime farmland in Chenango County are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units."

Some soils that have a high water table may qualify for prime farmland if this limitation is overcome by drainage. In table 5, this need for drainage is shown in parentheses after the appropriate map unit name. Onsite evaluation is necessary to see if the water table has been overcome by drainage.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; for woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Dr. Shaw Reid, Cornell University Agronomy Department, assisted in the review of this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants and the capability classification are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Erosion is a major concern on about half of the cropland in Chenango County. The hazard of erosion is related to the slope of the land, the erodibility of the soils, the rainfall, and the amount and type of plant cover.

The loss of soil through erosion is damaging for several reasons. Erosion causes a loss of nutrients and water, formation of gullies on hillsides, detrimental sedimentation downslope, and pollution of streams and reservoirs. Soil productivity generally is reduced as the surface layer is lost and increasing amounts of the subsoil are incorporated into the plow layer. This is especially true of soils with a compact subsoil that restricts the depth of rooting, such as Mardin and Wellsboro soils. Erosion also reduces productivity on soils that tend to be droughty, such as Chenango soils, through the loss of organic matter. Soils that are shallow or moderately deep to bedrock, such as Lordstown, Oquaga and Arnot soils, are permanently damaged by erosion.

Most soils with slopes of more than 3 percent require some type of measure to control water erosion. Soils that are high in silt content and low in rock fragment content, such as Unadilla, Scio, and Canaseraga soils, are the most susceptible to erosion.

Erosion-control practices provide protective cover, reduced runoff, and increased infiltration. Many conservation tillage systems and other conservation practices aid in erosion control. Conservation tillage, no-till farming, leaving crop residue on the surface, and using sod-forming crops and cover crops in the cropping system are suitable management practices for soils with short, irregular slopes, such as sloping Chenango and Howard soils. Contour tillage, stripcropping, and the use of diversions are more suitable on soils that have smooth, long, uniform slopes, such as sloping Mardin, Volusia, Wellsboro, and Lackawanna soils.

The erosion-control effectiveness of a particular conservation practice or combination of conservation practices differs from one soil to another, and different combinations can be equally effective on the same soil.

Drainage is needed on about one-third of the acreage used for crops and pasture in the survey area. Some soils are so wet that the production of crops common to the area generally is not possible without the installation of extensive drainage systems. These are, for example, poorly drained and very poorly drained Alden, Atherton, Canandaigua, Norwich, Chippewa, and Wayland soils.

Seasonal wetness interferes with early planting, growth, and harvesting of most crops on somewhat poorly drained soils. Examples in this category are Tuller, Volusia, Red Hook, Morris, and Raynham soils. Crops grown on these soils respond well to improved drainage. Crop production on drained soils is almost as high as production on soils that are naturally better drained.

Some well drained and moderately well drained soils, such as Bath, Valois, Mardin, Lackawanna, and Wellsboro soils, contain small inclusions of wetter soils that require subsurface drains to make management of fields more uniform.

The design of a drainage system varies with the kind of soil. A combination of surface drainage and subsurface drainage is needed in most areas of poorly drained and very poorly drained soils. Establishing drainage outlets in these soils often is difficult and expensive. A surface drainage system commonly involves constructing open ditches and grass waterways. A subsurface drainage system mainly consists of tile or plastic drains.

Drains must be more closely spaced in soils that have slow permeability than in more permeable soils. Subsurface drainage is slow in such soils as Morris, Norwich, and Chippewa soils. These soils also require surface drainage in places. Soils that have rapid or moderate permeability, such as Atherton and Red Hook soils, respond well to subsurface drainage if adequate outlets are available. Some wet, sloping soils respond well to interceptor drains that divert surface runoff and subsurface seepage away from the area. The sloping Volusia and Morris soils are examples.

Surface stones, boulders, and rock outcrops severely limit the use of soils for cropland and pasture in some areas of the county. These limitations interfere with the use of modern farming machinery. Some areas of very stony soils are only used for permanent pasture. An example of very stony soils is Mardin and Wellsboro very stony silt loams, 3 to 8 percent slopes.

Moderately deep and shallow soils, for example, Lordstown, Oquaga, and Arnot soils, that have areas of rock outcrop are generally unsuited to cultivation. Their use is largely limited to pasture, hay, and woodland.

Removal of stones and boulders from soils that have few other limitations for cultivated crops is feasible. Removal of rock outcrop is generally not feasible for cultivated crops.

Available water capacity is important for crops. Some soils in the county are droughty. Sandy and gravelly soils, soils that have a firm underlying layer, and soils that are shallow or moderately deep to bedrock tend to have a low capacity to store water. Chenango soils that have sand and gravel in the substratum, Mardin soils that have a fragipan, and Arnot soils that are shallow to bedrock have low available water capacity. Maintaining or increasing organic matter content and improving soil structure help increase the available water capacity of these droughty soils. The use of green-manure crops and the use of crop residue and animal manure on the surface layer are practices that build up organic matter levels and improve soil structure.

Tilth influences the emergence of seedlings, the infiltration of water into the soil, and the ease of cultivation. Soils that have good tilth generally have granular structure and are porous.

Excessive tillage tends to reduce organic matter content and to break down soil structure. Some soils that are deep, well drained, and moderately coarse textured, such as Riverhead or Arkport soils, can be tilled with little concern for damaging tilth. Wetter and medium textured soils, such as Scio, Raynham, and Teel soils, must be tilled at the proper moisture content to prevent deterioration of the natural soil structure. Plowing or cultivating the soils when they are wet causes puddling and results in surface crusting and clodding when the soil dries. The crust restricts the movement of water into the soil and increases the amount of runoff. Cultivation at the proper soil moisture content, using sod crops, green-manure crops, and cover crops in the crop rotation, and the use of crop residue and animal manure are practices that help keep the soil granular and porous and in good tilth.

Fertility is low in most soils in the county, and lime and fertilizer are needed in most. The amounts needed depend on the natural content of lime and plant nutrients in the soil, the needs of the particular crop, and the level of yield desired.

Organic matter content is a measure of soil fertility. The average organic matter content is about 2 to 4 percent in the surface layer of the well drained soils in Chenango County. Poorly drained and very poorly drained soils, such as Wayland and Alden soils, generally have a higher content of organic matter. Nitrogen in the organic matter is in complex organic forms and is unusable by plants until the organic matter is slowly decomposed by soil micro-organisms. It is necessary to apply nitrogen fertilizer to supplement the nitrogen made available from the organic matter. Management practices that build up organic matter levels, such as the use of green-manure and sod crops and the use of crop residue on the soil surface, help to improve the nitrogen content.

Nitrogen can be lost by leaching from rapidly permeable soils, such as Chenango soils, or by denitrification in wet and less permeable soils, such as Volusia soils. Small amounts of nitrogen applied at timely intervals, such as at planting and as a side dressing while the crop is growing, give the best results.

The soils in Chenango County generally are low in content of natural phosphorus. The addition of appropriate amounts of phosphate in the form of commercial fertilizers is essential for good crop response.

Most of the soils are low or medium in content of potassium. The potassium-supplying power of a soil depends upon the clay content. Coarse-textured soils have low potassium-supplying power. The addition of appropriate amounts of potassium fertilizer is essential for optimum crop yields.

Special crops are not grown extensively in Chenango County. In 1974, about 300 acres in the county was used commercially for sweet corn, potatoes, and cabbage. Deep soils, such as Riverhead, Unadilla, and Howard soils, that have good natural drainage and moderate to high available water capacity and that do not have impervious layers are especially well suited to vegetables.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management and the capability classification of each soil are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in table 6.

Woodland Management and Productivity

Robert E. Smith Jr., forester, Soil Conservation Service, assisted with the preparation of this section.

Chenango County is 59 percent forested (*5*), all of which is classified as commercial, or producing or capable of producing crops of industrial wood at a rate of more than 20 cubic feet per acre per year. The area of commercial forest has increased from about 305,000 acres in 1968 to 340,000 acres in 1980. This increase is largely the result of trees growing in abandoned pastureland and cropland.

Nearly 38 percent of the forest (128,000 acres) in the county is classified as sawtimber stands, 26 percent as poletimber, 33 percent as sapling-seedling stands, and 3 percent as nonstocked.

The dominant types of trees, covering about 74 percent of the woodland, are northern hardwoods, which consist of sugar maple, beech, black cherry, and soft maple. The common associated trees are white ash, hemlock, basswood, aspen, and red oak. Softwood types, mostly white pine and plantations of pines, spruces, and larch, make up about 14 percent of the woodland and oak types about 12 percent.

Site index	Northern hardwoods	Northern red oak	Eastern white pine
	cubic feet per acre		
50	32	34	81
55	35	38	92
60	38	43	102
65	40	47	114
70	43	52	127
75	47	57	137
80	50	62	147

Figure 10.—Wood volume yields by species and site indices.

The productivity of the commercial forestland in the south-central highlands of New York has been assessed by the Forest Service and is shown in the following paragraph. The figures are based upon the assumed ability of the land to produce industrial wood and show the mean annual growth of growing stock trees under fully stocked natural stands. The figures, in a relative way, give an indication of the wood production in Chenango County.

The productive capacity of commercial forestland in south-central New York is as follows: 3 percent is capable of producing 120 to 165 cubic feet per acre per year; 15 percent, 85 to 119 cubic feet per acre per year; 65 percent, 50 to 84 cubic feet per acre per year; and 17 percent, 20 to 49 cubic feet per acre per year. Chenango County has about 17 percent of the commercial forestland of the region.

Even on the best sites, the production of northern hardwood tree species (maple, cherry, and ash) usually does not exceed 50 cubic feet per acre. The annual growth of upland oak species will probably not exceed 60 cubic feet. Eastern white pine and spruce species generally produce as much on the poor sites as the hardwood species are capable of producing on the best sites. The table in figure 10 converts site indices, given in table 8, to wood volume yields by species. The data indicate the relative potential productivity for each species (fig. 10).

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *d*, restricted root depth; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, d, and r.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management

or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The site index figures are based upon plot data collected by foresters and soil scientists in the northeastern states. The figures are the mean taken from plots on each soil in the survey area. Aspect, position on the slope, and elevation have been recorded at these plots but have not been evaluated for their effect on site index. Some site index figures in table 8 are based upon data from only one plot, and some are estimates based upon plot data from soils similar to the one for which the site index is given.

Trees to plant are those that are suited to the soils and to commercial wood production. Tree species suitable for Christmas tree production and windbreaks are also listed.

Recreation

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Robert E. Myers, wildlife biologist, Soil Conservation Service, assisted with the preparation of this section.

The dairy farms, idle cropland, and large areas of forest in the county result in excellent habitat for white-tailed deer, wild turkey, ruffed grouse, fox, gray squirrels, and cottontail rabbits. Snowshoe hare are in localized extensive stands of conifers and hardwoods. A few pheasants are in the more intensively farmed areas in the Chenango River Valley. Songbirds are common throughout the county.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, timothy, bromegrass, clover, birdsfoot trefoil, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, and asters.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, beech, poplar, cherry, birch, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are autumn-olive, honeysuckle, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, arrowhead, burreed, bulrushes, sedges, and cattails.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, snowshoe hare, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to

sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a very firm layer, and the available water capacity in the upper 40 inches of the soil affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a fragipan, and flooding affect absorption of the effluent. Large stones and bedrock or a fragipan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a fragipan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and a fragipan can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a fragipan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a fragipan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Edward A. Fernau, senior soil engineer, New York State Department of Transportation, Soil Mechanics Bureau, assisted with the preparation of this section.

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Some soils in table 17 are assigned to two hydrologic soil groups. Dual grouping is used for one of two reasons: (1) Some soils have a seasonal high water table but can be drained. In this instance the first letter applies to the drained condition of the soil and the second letter to the undrained condition. (2) In some soils that are less than 20 inches deep to bedrock, the first letter applies to areas where the bedrock is cracked and pervious and the second letter to areas where the bedrock is impervious or where exposed bedrock makes up more than 25 percent of the surface of the soil.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is speci-

fied as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the New York State Department of Transportation, Soil Mechanics Bureau.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO), Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), Liquid limit—T 89 (AASHTO), Plasticity index—T 90 (AASHTO), Moisture density, Method C—T 99 (AASHTO), Shrinkage—D 427 (ASTM).

Engineering Properties of Geologic Deposits

This section describes the engineering characteristics of the unconsolidated geologic deposits in Chenango County and lists the soils formed in those deposits. The descriptions should be helpful to planners, designers, engineers, contractors, and others associated with construction projects involving earthy materials. Some of the terms used in soil engineering do not mean the same as similar soil science terms. The terms used are defined in the glossary.

The following geologic deposits are in Chenango County: glacial till, outwash, delta, lacustrine, alluvial, and organic. The engineering significance of each geologic deposit is influenced to a great extent by its mode of deposition which, in turn, determines the texture of the material and the internal structure of the landform. Other influences are the location on the landscape and the position of the water table. In Chenango County the geologic deposits are grouped into the following categories: deep till deposits, shallow-to-rock deposits, stratified coarse-grained deposits, stratified fine-grained deposits, and organic deposits.

Deep Till Deposits

Deep till deposits are unstratified, highly variable mixtures of all particle sizes ranging from rock fragments to clay. This material was scoured and transported from nearby sources by glacial ice and deposited as ground moraine or end moraine. Bedrock mainly is more than 5 feet beneath the soil surface, but in some small areas the depth to rock is less or a few rock outcrops are at the surface. The individual rock and mineral fragments in the soil generally reflect the types of bedrock in the immediate area.

The Alden, Bath, Canaseraga, Chippewa, Lackawanna, Lansing, Mardin, Morris, Norwich, Valois, Volusia, and Wellsboro soils formed in mixed deep till deposits. The Canaseraga soils have a veneer of stratified fine-grained lacustrine material over deep glacial till. The Valois soils are on morainal deposits and in some areas contain more water-worked material than generally exists in deep till deposits.

These soils are the most dense and compact of the unconsolidated deposits of the county. Most of the tills have been subjected to the compactive weight of overriding ice. Deep till soils range from nearly level to very steep, and most are gently sloping. Many landscapes are

such that cut and fill earthwork is needed for most types of construction. The soils generally provide stable, relatively incompressible foundations for engineering works. When properly compacted, fill material from these deposits generally provides stable embankments. Steep cut slopes often are subject to surface sloughing and erosion.

Shallow-to-Rock Deposits

Shallow-to-rock deposits are unstratified mixtures of glacial till deposited as a veneer over bedrock. The soil mainly is from 1 to 4 feet thick, but rock outcrops are in some areas. The landforms and topography are generally controlled by the bedrock.

The Arnot, Greene, Lordstown, Oquaga, and Tuller soils formed over siltstone, sandstone, and shale. The bedrock units of Chenango County are described in the section "Physiography and Geology."

Soils formed in shallow-to-rock deposits of glacial till have adequate foundation strength for light structures. The primary engineering concerns commonly are the underlying bedrock and ground-water conditions. In general, the shale and siltstone bedrock is softer and more deeply weathered than the sandstone. Fill material is limited in quantity because of the closeness of bedrock to the surface.

Stratified Coarse-Grained Deposits

Materials dominated by gravel and sand sorted by glacial meltwater into stratified deposits are in this category, as are the coarser textured materials deposited by fluvial action. Both types occupy such geologic landforms as outwash plains and terraces, alluvial fans, ice-contact deposits, and the coarser textured parts of deltas and flood plains. Some of the strata within these deposits are well sorted or poorly sorted and are of particle sizes ranging from cobblestones to silt. The deposits mainly are loose and porous and have moderately rapid to rapid permeability.

The Arkport, Atherton, Castile, Chenango, Howard, Phelps, Red Hook, Riverhead, and Trestle soils formed in gravelly outwash plains and terraces, ice-contact deposits, and deltas. The Arkport soils also formed in sandy delta deposits or sandy terraces, the Chenango soils in alluvial fan deposits, and the Trestle soils in alluvial fills along high-gradient streams.

Coarse-grained deposits generally have relatively high strength. Because of their loose and porous nature, most of the deposits are not highly erodible but are subject to settlement when vibrated.

The deposits of gravel and sand have many uses as a construction material. Depending on gradation, soundness, and plasticity, they may be used for such purposes as:

1. Fill material for highway embankments
2. Fill material for parking areas and developments
3. Fill material to decrease stress on underlying soils so that construction operations may progress
4. Subbase for pavements
5. Wearing surfaces for driveways, parking lots, and some roads
6. Material for highway shoulders
7. Free draining backfill for structures and pipes
8. Outside shells of dams
9. Slope protection blankets to drain and help stabilize wet cut slopes
10. Sources of sand and gravel for general use

Stratified Fine-Grained Deposits

Deposits in this category consist of lacustrine, fine-grained sediment transported by glacial meltwater and deposited in quiet postglacial lakes and ponds. Some of the soils are on flood plains and consist of more recent slackwater deposits. Although these deposits are mostly silt, there is generally enough clay to make them plastic and sticky.

The Canandaigua, Scio, Raynham, and Unadilla soils formed in deep, silty deposits. Fluvaquents, Udifluvents, Hamlin, Teel, and Wayland soils formed on flood plains and alluvial terraces.

Because of their fine texture and high moisture content, these deposits have relatively low strength. They generally are compressible, and settlement may occur. The soils that have a high silt content are less compressible but are highly erodible and frost susceptible. The alluvial soils are prone to flooding.

The fine-grained deposits are difficult to use for engineering works, especially where the soils are flat and wet and subject to ponding, as are the Canandaigua soils. Sites for embankments and heavy structures or buildings on all soils formed in these sediments must be investigated for strength and settlement characteristics and effects of ground water.

Organic Deposits

Organic deposits for the most part are accumulations of plant remains. In places they contain a minimal amount of mineral soil. They are in very poorly drained depressions and bogs covered with water during much of the year.

Carlisle soils and Saprists and Aquents are organic soils. The soils in organic deposits are unsuitable for foundations for engineering works because the soils are wet, weak, and highly compressible. Generally, the organic material should be removed to suitable underlying material and replaced with suitable backfill. Filling over organic deposits causes long-term settlement.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*4*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Inceptisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquept (*Aqu*, meaning water, plus *ept*, from Inceptisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fragiaquepts (*Fragi*, meaning presence of a fragipan, plus *aquept*, the suborder of the Inceptisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Aeric* identifies the subgroup that is better aerated than is typical for the great group. An example is Aeric Fragiaquepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, mesic Aeric Fragiaquepts.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*3*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*4*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Alden series

The Alden series consists of deep, very poorly drained soils on glaciated uplands. The soils formed in local colluvium that overlies glacial till derived from siltstone, shale, and sandstone. Slopes are less than 1 percent.

Alden soils are commonly adjacent to Chippewa, Volusia, Mardin, Bath, and Valois soils. The Alden soils do not have the fragipan typical of the Chippewa, Volusia, Mardin, and Bath soils and are not so well drained as the Volusia, Mardin, Bath, or Valois soils.

Typical pedon of Alden silt loam, in the town of Greene, 0.3 mile north of the intersection of Johnson and Shaffer Roads and 260 feet west of Johnson Road:

A1—0 to 5 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; slightly sticky; many fine roots; medium acid; abrupt wavy boundary.

B21g—5 to 16 inches; gray (10YR 6/1) silt loam; many medium distinct yellowish brown (10YR 5/8) mottles and common fine distinct grayish brown (2.5Y 5/2) mottles; moderate medium and fine subangular blocky structure; friable; slightly sticky; common fine roots; 2 percent coarse fragments; neutral; clear wavy boundary.

B22g—16 to 40 inches; grayish brown (2.5Y 5/2) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles and few fine faint light olive brown (2.5Y 5/4) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; slightly sticky; few fine roots extend along prism faces; 5 percent coarse fragments; neutral; gradual smooth boundary.

IICg—40 to 62 inches; grayish brown (2.5Y 5/2) flaggy silt loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles and many medium distinct gray (10YR 5/1) mottles; massive; slightly sticky; 15 percent coarse fragments; neutral.

The thickness of the solum is 20 to 40 inches. The depth to free carbonates is more than 40 inches, and the depth to bedrock is more than 60 inches.

The A horizon is neutral or has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 0 through 2. The fine-earth fraction is fine sandy loam to silt loam. The content of rock fragments ranges from 0 to 10 percent. Reaction is strongly acid to neutral.

The Bg horizon has hue of 5YR through 2.5Y, value of 4 through 6, and chroma of 1 or 2. The fine-earth fraction is very fine sandy loam, silt loam, or silty clay loam. The horizon has subangular blocky or platy structure with or without weak to strong, coarse or very coarse prisms. Consistence is friable or firm. The content of rock fragments ranges from 0 to 10 percent. Reaction is medium acid to neutral.

The Cg horizon has hue of 5YR through 5Y, value of 4 or 5, and chroma of 1 or 2. The fine-earth fraction is fine sandy loam, loam, silt loam, or silty clay loam. The horizon is massive or has weak platy structure. The content of rock fragments ranges from 5 to 35 percent. Reaction is slightly acid to moderately alkaline.

The Alden soils in the survey area are a taxadjunct to the Alden series because the surface layer is not thick enough to be a mollic epipedon and the subsoil has less sand than is defined for the range of the series. These differences, however, do not affect use and management of the soils.

Aquents

Aquents consist of deep, very poorly drained soils that formed in water-deposited sand, silt, and clay. The soils are in low areas and depressions adjacent to water and have shallow water on the surface for much of the year. Slopes range from 0 to 1 percent.

Aquents in Chenango County are mapped only with Saprists, which formed in well decomposed deposits of organic material. Aquents are commonly near Canandaigua, Alden, Atherton, and Carlisle soils, all of which are on slightly higher areas.

Aquents are highly variable; therefore, a typical pedon is not provided. Aquents have mineral layers that generally are high in organic matter content. The depth to bedrock generally is more than 5 feet.

The surface layer is well decomposed organic matter that is neutral or has hue of 10YR through 5YR, value of 2 or 3, and chroma of 0 through 2 and is less than 6 inches thick. Mineral soil material is less than 20 percent of the surface layer. Reaction ranges from medium acid to neutral.

The substratum has hue of 5YR through 10YR, value of 3 through 5, and chroma of 1 or 2. It is silt loam to sandy loam. Reaction ranges from medium acid to neutral.

Arkport series

The Arkport series consists of deep, well drained soils on deltas and terraces. The soils formed in sandy deposits from glacial streams and glacial lakes. Slopes are 3 to 8 percent.

Arkport soils are on the landscape with Howard, Riverhead, Chenango, Unadilla, Hamlin, and Teel soils. The Arkport soils have less silt in the subsoil than the Unadilla soils; less gravel in the subsoil than the Howard, Chenango, or Riverhead soils; and are not subject to flooding as are the Hamlin and Teel soils.

Typical pedon of Arkport fine sandy loam, 3 to 8 percent slopes, in the town of Greene, 0.3 mile south of the intersection of County Route 32 and Furman Road, and 1,600 feet west of County Route 32:

Ap—0 to 9 inches; dark brown (7.5YR 4/2) fine sandy loam; moderate fine granular structure; very friable; many fine roots; 3 percent coarse fragments; neutral; abrupt smooth boundary.

B21—9 to 16 inches; brown (7.5YR 5/4) fine sandy loam; moderate fine granular structure; very friable; common fine roots; many fine pores; neutral; gradual wavy boundary.

A21&B22t—16 to 29 inches; light brown (7.5YR 6/4) loamy fine sand (A2); massive; very friable; lamellae of brown (7.5YR 5/4) fine sandy loam (B22t); weak fine subangular blocky structure in thicker bands; friable; 1/16 inch to 2 inches thick lamellae through-

out horizon; clay bridges between sand grains in B22t; few coarse roots; common fine pores; slightly acid; abrupt wavy boundary.

A22&B23t—29 to 42 inches; brown (10YR 5/3) loamy fine sand; massive; friable; lamallae of dark brown (7.5YR 4/4) fine sandy loam (B2t); lamallae 1 inch to 2 inches thick throughout horizon; few coarse roots; neutral; abrupt wavy boundary.

C—42 to 65 inches; dark brown (10YR 4/3) fine sand; single grain; loose; few coarse roots; neutral.

The solum thickness ranges from 40 to 96 inches. The depth to bedrock is more than 60 inches. The depth to carbonates is 40 to 120 inches.

The Ap horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 or 3. It is loamy fine sand to silt loam. It has friable or very friable consistence. The gravel content ranges from 0 to 5 percent. Reaction is very strongly acid to neutral.

The B2 horizon has hue of 5YR through 10YR, value of 5 or 6, and chroma of 3 through 8. It is loamy fine sand to very fine sandy loam. It is massive or single grain or has granular or subangular blocky structure. It has loose to friable consistence. Reaction is very strongly acid to neutral.

The A2 part of the A2&B22t horizon has hue of 5YR through 2.5Y, value of 5 through 7, and chroma of 2 through 4. It is fine sand to loamy very fine sand. It is massive or has granular or subangular blocky structure. The B22t part of the A2&B22t horizon has hue of 5YR through 10YR, value of 3 through 5, and chroma of 3 or 4. It is very fine sandy loam to loamy fine sand. It is massive or has subangular blocky or platy structure. It has friable or firm consistence. Reaction is strongly acid to neutral.

The C horizon has hue of 5YR or 10YR, value of 4 through 6, and chroma of 2 through 4. It is fine sand to very fine sandy loam. It is massive or single grain. It has loose to friable consistence. Reaction is medium acid to moderately alkaline.

Arnot series

The Arnot series consists of shallow, somewhat excessively drained to well drained soils on bedrock-controlled, glaciated uplands. The soils formed in glacial till derived from sandstone, shale, and siltstone. Slopes range from 3 to 15 percent.

Arnot soils commonly are near moderately deep, well drained Lordstown soils; moderately deep, somewhat poorly drained and poorly drained Greene soils; shallow, somewhat poorly drained to poorly drained Tuller soils; and deep Bath, Mardin, and Volusia soils that have a fragipan.

Typical pedon of Arnot channery silt loam, 3 to 8 percent slopes, in the town of Sherburne, 1.75 miles north of NY Route 12B, and 550 feet east of Stone House Road:

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) channery silt loam; moderate medium and fine granular structure; very friable; many fine roots; 20 percent coarse fragments; strongly acid; clear smooth boundary.

B21—6 to 13 inches; dark brown (7.5YR 4/4) very channery silt loam; moderate fine and medium subangular blocky structure; very friable; many fine and few medium roots; common fine pores; 35 percent coarse fragments; medium acid; gradual smooth boundary.

B22—13 to 16 inches; dark brown (10YR 4/3) very channery silt loam; weak medium subangular blocky structure; friable; common fine roots; common fine pores; 50 percent coarse fragments; medium acid; abrupt smooth boundary.

R—16 inches; dark gray (N 4/0) fine grained sandstone bedrock interbedded with shale.

The solum thickness and the depth to bedrock range from 10 to 20 inches.

The A horizon has hue of 5YR through 2.5Y, value of 2 through 4, and chroma of 2 or 3. The fine-earth fraction is loam or silt loam. The rock fragment content ranges from 15 to 35 percent. Reaction is extremely acid to medium acid.

The B horizon has hue of 2.5YR through 2.5Y, value of 4 through 6, and chroma of 3 or 4. The fine-earth fraction is silt loam or loam. The B horizon has subangular blocky or granular structure. The rock fragment content ranges from 35 to 70 percent. Reaction is extremely acid to medium acid.

The R horizon is interbedded sandstone, siltstone, and shale. The rock is jointed and commonly is fractured along joint planes in the upper part.

Atherton series

The Atherton series consists of deep, poorly drained to very poorly drained soils on outwash plains and terraces in valleys. The soils formed in glacial outwash derived from sandstone, siltstone, shale, and small amounts of limestone. Slopes range from 0 to 3 percent.

Atherton soils commonly are near better drained Castile, Phelps, and Chenango soils. Hamlin, Teel, and Wayland soils are on nearby flood plains. Raynham and Canandaigua soils are similar to Atherton soils but formed in thicker deposits of silt.

Typical pedon of Atherton silt loam, in the town of Smyrna, 660 feet west of County Route 22, and 700 feet southeast of Reynolds Hill Road:

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam; weak fine subangular blocky structure; friable; many fine and common medium roots; few fine pores; neutral; clear smooth boundary.

B21g—8 to 25 inches; grayish brown (10YR 5/2) silt loam; many medium prominent yellowish red (5YR 4/8) mottles; massive; firm; few fine roots; 5 percent coarse fragments; neutral; gradual smooth boundary.

IIB22—25 to 39 inches; dark brown (7.5YR 4/4) gravelly loam; many coarse distinct dark grayish brown (10YR 4/2) mottles; massive; firm; 25 percent coarse fragments; neutral; clear smooth boundary.

IIC—39 to 60 inches; dark brown (10YR 4/3) very gravelly loam; many coarse faint dark grayish brown (10YR 4/2) mottles; massive; very friable; 35 percent coarse fragments; neutral.

The thickness of the solum ranges from 20 to 44 inches. The depth to bedrock is more than 60 inches.

The Ap horizon is neutral or has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 0 through 2. The fine-earth fraction is very fine sandy loam to silty clay loam. The horizon has granular or subangular blocky structure. Consistence is very friable or friable. The content of rock fragments ranges from 0 to 10 percent. Reaction is strongly acid to neutral.

The B21 horizon is neutral or has hue of 5YR through 5Y, value of 4 or 5, and chroma of 0 through 2. The B22 horizon has hue of 5YR through 5Y, value of 4 or 5, and chroma of 3 or 4. Mottles are common or many and distinct or prominent. The fine-earth fraction is loam to silty clay loam. The horizon is massive or has prismatic or blocky structure. Consistence is friable or firm. The content of rock fragments ranges from 0 to 20 percent in the upper part and 5 to 35 percent in the lower part. Reaction is medium acid to mildly alkaline.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 6. The fine-earth fraction is fine sandy loam to silty clay. The content of rock fragments ranges from 10 to 35 percent. Reaction is medium acid to mildly alkaline.

Bath series

The Bath series consists of deep, well drained soils on glaciated uplands. The soils formed in glacial till deposits derived from siltstone, shale, and sandstone. Slopes range from 3 to 30 percent.

Bath soils are in a drainage sequence with Mardin, Volusia, and Chippewa soils, which are not so well drained, and are near very poorly drained Alden soils and well drained Valois soils, neither of which has a fragipan. Bath soils also are near moderately deep Lordstown soils and red Lackawanna soils.

Typical pedon of Bath channery silt loam, 3 to 8 percent slopes, in the town of Columbus, 1/4 mile south of Lambs Corners Road, and 400 feet west of Norton Road:

Ap—0 to 11 inches; dark brown (10YR 4/3) channery silt loam; moderate fine and medium granular structure; very friable; many fine and common medium roots; 15 percent coarse fragments; medium acid; abrupt smooth boundary.

B21—11 to 15 inches; yellowish brown (10YR 5/6) channery silt loam; weak and medium subangular blocky structure; friable; common fine roots; common fine pores; 20 percent coarse fragments; strongly acid; clear broken boundary.

B22—15 to 25 inches; light olive brown (2.5Y 5/4) channery loam; moderate medium subangular blocky structure; friable; common fine roots; common fine and few medium pores; 25 percent coarse fragments; medium acid; clear wavy boundary.

A'2—25 to 29 inches; grayish brown (10YR 5/2) channery loam; few fine faint yellowish brown (10YR 5/4, 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine pores; 25 percent coarse fragments, 5 percent larger than 3 inches in diameter; medium acid; gradual wavy boundary.

B'x—29 to 52 inches; brown (10YR 4/3, 5/3) very channery silt loam; few fine faint yellowish brown (10YR 5/4, 5/6) mottles; weak very coarse prismatic structure parting to weak medium subangular blocky; firm and brittle; few fine roots along prism faces; few fine and few medium pores; 35 percent coarse fragments, 5 percent larger than 3 inches in diameter; lower part has clay films in pores and bridging sand grains; prisms separated by light brownish gray (2.5Y 6/2) streaks with strong brown (7.5YR 5/8) borders; medium acid; clear wavy boundary.

C—52 to 60 inches; light olive brown (2.5Y 5/4) very channery silt loam; few fine faint yellowish brown (10YR 5/6) mottles; massive; firm; few fine pores; 35 percent coarse fragments; pores in the upper part are clay lined; medium acid.

The solum thickness ranges from 40 to 80 inches. The depth to bedrock is more than 60 inches. The depth to the fragipan is 26 to 36 inches.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 through 4. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 15 to 35 percent. Reaction is very strongly acid to medium acid.

The B2 horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 3 through 6. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 5 to 35 percent. Reaction is very strongly acid to medium acid.

The A'2 horizon has hue of 10YR through 5Y, value of 5 or 6, and chroma of 2 or 3. The fine-earth fraction is silt loam to sandy loam. The content of rock fragments ranges from 10 to 35 percent. Reaction is very strongly acid to medium acid. In some pedons the horizon is not mottled.

The B'x horizon has hue of 7.5YR through 5Y, value of 3 through 5, and chroma of 3 through 6. Mottles are few

and faint or distinct. The fine-earth fraction is silt loam to sandy loam. The content of rock fragments ranges from 15 to 65 percent. Structure is platy or subangular blocky within very coarse prisms, or the soil is massive within prisms.

The C horizon has hue of 7.5YR through 5Y, value of 3 through 5, and chroma of 3 through 6. Mottles are few and faint or distinct. The fine-earth fraction is silt loam to sandy loam. The content of rock fragments ranges from 15 to 65 percent. Reaction is strongly acid to moderately alkaline.

Canandaigua series

The Canandaigua series consists of deep, poorly drained and very poorly drained soils in depressional areas on uplands where water-sorted sediments have accumulated to a depth of more than 40 inches. The soils formed in lacustrine deposits that have a high silt content. Slopes range from 0 to 3 percent but are dominantly less than 1 percent.

Canandaigua soils commonly are near Alden, Raynham, Mardin, and Volusia soils. The Canandaigua soils are in thicker deposits of silt than the Alden soils and have a higher clay content than the Raynham soils. The Mardin and Volusia soils have a fragipan.

Typical pedon of Canandaigua silt loam, in the town of Greene, 0.8 mile north of Route 79 and 660 feet east of County Route 32:

A1—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

B21g—7 to 14 inches; gray (10YR 6/1) silt loam; many fine distinct yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable; common fine roots; common fine pores; old root and worm channels filled with very dark grayish brown (10YR 3/2) A1 material; slightly acid; clear wavy boundary.

B22g—14 to 27 inches; gray (10YR 5/1) silt loam; many medium distinct strong brown (7.5YR 5/6) mottles and few medium distinct yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable; common fine roots; common fine pores; slightly acid; clear wavy boundary.

C1—27 to 35 inches; gray (10YR 5/1) silt loam; few fine distinct light olive brown (2.5Y 5/6) mottles; massive; friable; few fine roots; few fine pores; neutral; abrupt wavy boundary.

IIC2—35 to 60 inches; gray (10YR 5/1) very fine sandy loam; few thin strata of loamy very fine sand; massive; nonsticky; very slightly effervescent; neutral.

The solum thickness ranges from 20 to 40 inches. The depth to carbonates ranges from 18 to 60 inches.

The A horizon is neutral or has hue of 5YR through 2.5Y, value of 2 or 3, and chroma of 0 through 2. The fine-earth fraction is silt loam or very fine sandy loam. Structure is granular or subangular blocky. The content of rock fragments ranges from 0 to 5 percent. Reaction is medium acid to mildly alkaline.

The B horizon is neutral or has hue of 5YR through 2.5Y, value of 5 through 7, and chroma of 0 through 2. Mottles are faint or distinct. The fine-earth fraction is very fine sandy loam to silty clay loam. Consistence is friable to very firm. The content of rock fragments ranges from 0 to 5 percent. Reaction is slightly acid to mildly alkaline.

The C horizon has hue of 5YR through 5Y, value of 3 through 6, and chroma of 1 through 3. The fine-earth fraction mainly is fine sandy loam to silty clay and thin strata of loamy very fine sand. The content of rock fragments ranges from 0 to 5 percent. Reaction is neutral to moderately alkaline.

Canaseraga series

The Canaseraga series consists of deep, well drained and moderately well drained soils that border upland areas. The soils formed in silt-mantled glacial till. Slopes range from 3 to 15 percent.

Canaseraga soils are near Mardin, Volusia, Howard, Chenango, and Unadilla soils. Neither the Mardin nor Volusia soils has a silt mantle. The Canaseraga soils have less gravel in the solum than the Howard or Chenango soils. The Unadilla soils formed in thick silt deposits.

Typical pedon of Canaseraga silt loam, 3 to 8 percent slopes, in the town of Afton, 2,250 feet north of NY Route 41 and 660 feet west of County Route 17:

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam; moderate fine granular structure; friable; many fine roots; 5 percent coarse fragments; medium acid; abrupt smooth boundary.

B21—8 to 16 inches; yellowish brown (10YR 5/6) silt loam; weak fine angular blocky structure; friable; many fine roots; few fine pores; medium acid; clear wavy boundary.

B22—16 to 24 inches; brownish yellow (10YR 6/6) silt loam; weak medium angular blocky structure; friable; common fine roots; common fine pores; strongly acid; clear wavy boundary.

A'2—24 to 29 inches; grayish brown (2.5Y 5/2) very fine sandy loam; moderate medium platy structure parting to weak very fine subangular blocky; firm; many fine pores; 10 percent coarse fragments; strongly acid; clear wavy boundary.

IIB'x1—29 to 40 inches; light olive brown (2.5Y 5/4) channery loam; few medium faint grayish brown (2.5Y 5/2) mottles; moderate medium angular blocky structure; very firm; common medium pores with

some clay films; 20 percent coarse fragments; medium acid; diffuse wavy boundary.

IIB'2—40 to 54 inches; grayish brown (2.5Y 5/2) channery loam; few medium faint light olive brown (2.5Y 5/4) mottles; moderate medium platy structure; very firm; few coarse pores with thin clay coatings; 25 percent coarse fragments of channers and gravel; medium acid; diffuse wavy boundary.

IIC—54 to 60 inches; light olive brown (2.5 5/4) channery loam; weak thick platy structure; very firm; few coarse pores; 30 percent fragments; medium acid.

The solum thickness ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The silt mantle is 15 to 36 inches thick and extends to or into the upper part of the fragipan.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 2 or 3. The fine-earth fraction is very fine sandy loam or silt loam. The content of rock fragments ranges from 0 to 5 percent. Consistence is very friable or friable. Reaction is very strongly acid to medium acid.

The B2 horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 3 through 6. Some pedons have faint mottles. The fine-earth fraction is very fine sandy loam or silt loam. The content of rock fragments ranges from 0 to 5 percent. Structure is granular or angular blocky. Consistence is friable or very friable. Reaction is very strongly acid to medium acid.

The A'2 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 or 3. Some pedons have faint or distinct mottles. The fine-earth fraction is sandy loam to silt loam. The content of rock fragments ranges from 0 to 10 percent. The horizon is massive, or it has platy or subangular blocky structure. Consistence is friable or firm. Reaction is very strongly acid to medium acid.

The Bx horizon has hue of 5YR to 5Y, value of 4 or 5, and chroma of 2 through 4. Mottles are few or common and faint or distinct. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 10 to 35 percent. Consistence is firm or very firm. Reaction is strongly acid to neutral.

The C horizon has the same range in color and texture as the Bx horizon. The content of rock fragments ranges from 10 to 35 percent. Structure is thick platy, or the soil is massive. Consistence is firm or very firm. Reaction is medium acid to moderately alkaline.

Carlisle series

The Carlisle series consists of deep, very poorly drained soils in bogs and swamps. The soils formed in well decomposed organic deposits more than 51 inches thick. Slopes range from 0 to 2 percent but are dominantly less than 1 percent.

Carlisle soils are near and consist of thicker organic deposits than Alden, Atherton, Wayland, and Canandaigua soils. Somewhat excessively drained to well drained Chenango soils commonly form the rim around bogs that contain Carlisle soils. Carlisle soils also are near Saprists and Aquents, which are covered with water most of the year.

Typical pedon of Carlisle muck, in the town of Greene, 300 feet south of the intersection of NY Routes 41 and 206, and 50 feet east of Stein Road:

Oa1—0 to 9 inches; black (10YR 2/1) broken face and rubbed muck (sapric material); moderate medium granular structure; friable; nonsticky, slightly plastic; 10 percent fiber, 1 percent rubbed; common roots; 20 percent silt; strongly acid; clear smooth boundary.

Oa2—9 to 20 inches; dark reddish brown (5YR 2/2) broken face and rubbed muck (sapric material); massive; friable, nonsticky, slightly plastic; 40 percent fiber, 5 percent rubbed; unrubbed fibers are reddish brown; 5 percent silt; strongly acid; clear smooth boundary.

Oa3—20 to 42 inches; dark reddish brown (5YR 2/2) broken face and rubbed muck (sapric material); massive; nonsticky, slightly plastic; 40 percent fiber, 10 percent rubbed; unrubbed fibers are reddish brown; strongly acid; clear smooth boundary.

Oa4—42 to 67 inches; dark reddish brown (5YR 2/2) broken face and rubbed muck (sapric material); massive; slightly sticky, slightly plastic; 10 percent fiber, 2 percent rubbed; unrubbed fibers are reddish brown; strongly acid; clear smooth boundary.

Oa5—67 to 103 inches; very dark grayish brown (10YR 3/2) broken face and rubbed muck (sapric material); massive; nonsticky, slightly plastic; 20 percent fiber, 2 percent rubbed; fibers are of moss origin; strongly acid; clear smooth boundary.

Oa6—103 to 132 inches, dark brown (10YR 3/3) broken face and rubbed muck (sapric material); massive; slightly sticky, slightly plastic; 20 percent fiber, 2 percent rubbed; 20 percent silt; strongly acid; clear smooth boundary.

Oa7—132 to 162 inches, dark brown (10YR 3/3) broken face and rubbed muck (sapric material); massive; slightly sticky, slightly plastic; 20 percent fiber, 2 percent rubbed; 40 percent silt, partly as 1-inch gray strata; medium acid.

The thickness of the organic material is more than 51 inches. Some pedons have woody fragments throughout the profile that consists of twigs, branches, logs, and stumps.

The surface tier has hue of 10YR, value of 2, and chroma of 1 or 2. Reaction is very strongly acid to neutral.

The subsurface tier is neutral or has hue of 5YR through 10YR, value of 2 or 3, and chroma of 0 through 3. The organic material is sapric and is about 10 to 40 percent fiber and 2 to 10 percent fiber when rubbed. It

has granular or blocky structure, or the soil is massive. Reaction is very strongly acid to neutral.

The bottom tiers are neutral or have hue of 5YR through 10YR, value of 2 or 3, and chroma of 0 through 3. Fiber content is 10 to 30 percent and 2 to 6 percent when rubbed. The silt content increases with depth. The layers mainly are massive or have subangular blocky or thick platy structure. Reaction is very strongly acid to neutral.

Castile series

The Castile series consists of deep, moderately well drained soils formed in gravelly outwash deposits overlying stratified sand and gravel. These soils are on valley floors and low terraces. Slopes range from 0 to 8 percent.

Castile soils are near somewhat excessively drained to well drained Chenango and Howard soils and Hamlin, Teel, and Wayland soils on adjacent flood plains.

Typical pedon of Castile gravelly silt loam, 0 to 3 percent slopes, in the town of Bainbridge, 1.2 miles north of Searles Hill Road, and 150 feet east of County Route 38:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) gravelly silt loam; moderate coarse granular structure; very friable; many fine roots; many pores; 30 percent coarse fragments; slightly acid (limed); abrupt smooth boundary.

B21—8 to 17 inches; brown (10YR 4/3) gravelly silt loam; weak medium subangular blocky structure; friable; common roots; common pores; 40 percent coarse fragments; medium acid; clear wavy boundary.

B22—17 to 29 inches; brown (10YR 5/3) very gravelly silt loam; common medium and fine faint grayish brown (10YR 5/2) and distinct brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; common roots; common pores; 35 percent coarse fragments; medium acid; abrupt wavy boundary.

IIC—29 to 60 inches; dark brown (10YR 4/3) stratified sand and gravel; black (10YR 2/1) and very dark gray (10YR 3/1) manganese coatings on gravel; single grain; loose; few pores; 60 percent coarse fragments; neutral.

The solum thickness ranges from 24 to 40 inches. The depth to bedrock is more than 60 inches. The depth to carbonates is more than 5 feet.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 or 3. The fine-earth fraction is sandy loam to silt loam. The content of rock fragments ranges from 15 to 30 percent. Reaction in unlimed areas is very strongly acid to medium acid.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 2 through 4. The fine-earth fraction is sandy loam to silt loam. Structure is granular or subangular blocky. Consistence is very friable to firm. The content of rock fragments ranges from 20 to 60 percent. Reaction is very strongly acid to medium acid.

The C horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 2 through 4. The fine-earth fraction is sand to loam, and commonly it is stratified. It is single grain or massive. The content of rock fragments ranges from 35 to 70 percent. Reaction is strongly acid to neutral.

Chenango series

The Chenango series consists of deep, well drained to somewhat excessively drained soils on outwash terraces, kames, eskers, valley trains, and alluvial fans. The soils formed in glacial outwash deposits derived from sandstone, siltstone, and shale. Slopes range from 0 to 35 percent.

Chenango soils commonly are near moderately well drained Castile soils, somewhat poorly drained Red Hook soils, and poorly drained and very poorly drained Atherton soils. Chenango soils also are near Unadilla and Scio soils on terraces; Hamlin, Teel, and Wayland soils on flood plains; and Howard soils on lower terraces.

Typical pedon of Chenango gravelly silt loam, 3 to 8 percent slopes, in the town of Greene, 650 feet east of County Route 32, and 460 feet north of Hotchkiss Road:

Ap—0 to 9 inches; dark brown (10YR 3/3) gravelly silt loam; weak fine granular structure; friable; many fine roots; 15 percent coarse fragments; slightly acid (limed); abrupt smooth boundary.

B21—9 to 22 inches; dark yellowish brown (10YR 4/4) gravelly silt loam; weak medium subangular blocky structure; friable; common fine and few medium roots; common medium and fine pores; 25 percent coarse fragments; medium acid; clear wavy boundary.

B22—22 to 30 inches; dark yellowish brown (10YR 4/4) very gravelly loam; weak fine and medium subangular blocky structure; very friable; few fine roots; common medium and few large pores; 50 percent coarse fragments; medium acid; clear wavy boundary.

IIB3—30 to 34 inches; brown (10YR 4/3) very gravelly sandy loam; massive; very friable; few fine roots; 60 percent coarse fragments; medium acid; diffuse wavy boundary.

IIC—34 to 62 inches; dark brown (10YR 3/3) coarse sand and gravel; single grain; loose; 70 percent coarse fragments; slightly acid.

The thickness of the solum ranges from 24 to 50 inches. The depth to bedrock is more than 60 inches.

The Ap horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 or 3. The fine-earth fraction is sandy loam to silt loam. The content of rock

fragments ranges from 15 to 30 percent. Consistence is very friable or friable. Reaction in unlimed areas is very strongly acid or strongly acid.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 3 through 6. The fine-earth fraction is fine sandy loam to silt loam in the B2 horizon and sandy loam in the IIB3 horizon. The soil is massive or has subangular blocky or granular structure. Consistence is very friable to firm. The content of rock fragments ranges from 20 to 60 percent. Reaction is very strongly acid to medium acid.

The C horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 through 4. The fine-earth fraction is loamy fine sand to coarse sand. The soil is massive or single grain. The content of rock fragments ranges from 25 to 70 percent. Reaction is strongly acid to mildly alkaline.

Chippewa series

The Chippewa series consists of deep, poorly drained and very poorly drained soils on uplands. The soils formed in glacial till derived from siltstone, sandstone, and shale. Slopes range from 0 to 3 percent.

Chippewa soils are near somewhat poorly drained Volusia soils, moderately well drained Mardin soils, well drained Bath soils, shallow Arnot and Tuller soils, and moderately deep Greene and Lordstown soils. Chippewa soils are similar to Norwich soils but are browner.

Typical pedon of Chippewa channery silt loam, in an area of Chippewa and Norwich soils, in the town of Plymouth, 2.6 miles west of Moon Hill Road, and 150 feet north of old CCC truck trail:

A1—0 to 5 inches; very dark grayish brown (10YR 3/2) channery silt loam; moderate fine granular structure; friable; many fine roots; 15 percent coarse fragments, 5 percent greater than 3 inches in diameter; strongly acid; clear wavy boundary.

A21g—5 to 10 inches; dark grayish brown (10YR 4/2) channery silt loam; few fine distinct light gray (10YR 6/1) mottles; moderate medium and fine subangular blocky structure; friable; many fine roots; few fine pores; 15 percent coarse fragments; very strongly acid; clear wavy boundary.

A22g—10 to 15 inches; grayish brown (10YR 5/2) channery loam; few fine faint dark brown (10YR 4/3) mottles and common fine faint yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine pores; 15 percent coarse fragments; strongly acid; gradual wavy boundary.

Bx1g—15 to 22 inches; light brownish gray (10YR 6/2) channery silt loam; common medium faint yellowish brown (10YR 5/6) mottles and few fine faint dark yellowish brown (10YR 3/6) mottles; moderate very coarse prismatic structure parting to moderate medium and coarse subangular blocky; firm and brittle; common fine pores; 20 percent coarse fragments; strongly acid; gradual wavy boundary.

Bx2g—22 to 60 inches; dark grayish brown (10YR 4/2) channery loam; few fine faint light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) mottles; moderate very coarse prismatic structure; firm and brittle; 30 percent coarse fragments; prisms have light gray (10YR 6/1) faces and yellowish brown (10YR 5/8) streaks; medium acid.

The solum thickness ranges from 36 to 60 inches. The depth to the fragipan ranges from 8 to 20 inches, and the depth to bedrock is 60 inches or more.

The A1 horizon has hue of 10YR or 2.5Y, value of 2 through 4, and chroma of 1 or 2. The fine-earth fraction is silt loam to loam. The content of rock fragments ranges from 15 to 35 percent. Reaction is very strongly acid to slightly acid.

The A2g horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 or 2. Mottles are few to many and distinct or prominent. The fine-earth fraction is loam, clay loam, silt loam, or silty clay loam. The horizon has subangular blocky structure, or the soil is massive. Consistence is friable or firm. The content of rock fragments ranges from 10 to 35 percent. Reaction is very strongly acid to slightly acid.

The Bx horizon has hue of 10YR through 5Y, value of 3 through 6, and chroma mainly of 1 or 2; in some pedons subhorizons at a depth of more than 30 inches have chroma of 3 or 4. Mottles are few to many and are faint to prominent. The fine-earth fraction is silty clay loam to loam. The structure is moderate or strong and very coarse prismatic structure, and in most horizons it parts to subangular blocky. Consistence is firm to extremely firm and brittle. The content of rock fragments ranges from 20 to 50 percent. Reaction is strongly acid to neutral.

Some pedons have a C horizon that has the same colors and texture as the Bx horizon. The soil is massive or has weak or moderate platy structure. Consistence is firm or very firm. The content of rock fragments ranges from 20 to 50 percent. Reaction is medium acid to moderately alkaline.

Fluvaquents

Fluvaquents consist of deep, somewhat poorly drained to very poorly drained alluvial soils in material recently deposited by streams and rivers. The soils are along streams and rivers and are subject to frequent flooding. Slopes range from 0 to 5 percent.

Fluvaquents are in a complex with better drained Udifluvents and commonly are near Hamlin, Teel, Wayland, Chenango, and Trestle soils.

Fluvaquents are highly variable, and thus a typical pedon is not provided. The soils have little or no profile

development. The depth to bedrock is variable but is generally more than 60 inches.

The surface layer has hue of 2.5YR through 10YR, value of 2 through 4, and chroma of 1 through 3. It is sand to silty clay loam or their gravelly or very gravelly analogs. It is mottled in some pedons. Structure is granular, or the soil is massive. The content of rock fragments ranges from 0 to 70 percent. Reaction is strongly acid to mildly alkaline. The surface layer is from 2 inches to more than 12 inches thick.

The substratum is neutral or has hue of 7.5YR or 10YR, value of 3 through 6, and chroma of 0 through 2. Few to many mottles are present. The fine-earth fraction is sand to silty clay or their gravelly or very gravelly analogs. Structure is granular, or the soil is massive. The content of rock fragments ranges from 0 to 70 percent. Reaction is strongly acid to mildly alkaline.

Greene series

The Greene series consists of moderately deep, somewhat poorly drained and poorly drained soils that formed in glacial till deposits derived from siltstone, sandstone, and shale. Slopes range from 3 to 15 percent.

Greene soils formed in the same parent material as Arnot, Lordstown, and Tuller soils. The Greene soils are not so well drained as the Arnot soils, but are deeper than these soils, are not so well drained as the Lordstown soils, and are deeper than the Tuller soils. The Greene soils are near deep Volusia, Chippewa, Morris, Norwich, and Alden soils.

Typical pedon of Greene silt loam, 3 to 8 percent slopes, in the town of Smyrna, 1.5 miles north of Route 80 and 400 feet west of Dunham Road:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium and fine granular structure; friable; many fine roots; 10 percent coarse fragments; strongly acid; clear smooth boundary.

B21g—9 to 16 inches; light brownish gray (2.5Y 6/2) channery silt loam; many medium and coarse distinct yellowish brown (10YR 5/6 and 5/8) and light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; common fine pores; 15 percent coarse fragments; strongly acid; clear wavy boundary.

B22g—16 to 22 inches; grayish brown (2.5Y 5/2) channery silt loam; common medium faint light olive brown (2.5Y 5/6) mottles and few fine distinct light gray (10YR 7/2) mottles; moderate medium and coarse subangular blocky structure; friable; common fine pores; 20 percent coarse fragments; medium acid; clear smooth boundary.

C—22 to 34 inches; grayish brown (2.5Y 5/2) channery loam; common medium and fine faint gray (10YR 6/1) mottles and few fine distinct light olive brown (2.5Y 5/4) mottles; massive; firm in place; few fine pores; 20 percent coarse fragments; medium acid.

R—34 inches; fractured very dark gray (N 3/0) fine grained sandstone and siltstone.

The thickness of the solum ranges from 16 to 40 inches, and the depth to bedrock ranges from 20 to 40 inches. Rock fragments make up 5 to 35 percent of the soil.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 2. It is silt loam, silty clay loam, or loam in the fine-earth fraction. In unlimed areas the horizon ranges from very strongly acid to strongly acid.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 1 through 4 and has few to many mottles. Some pedons have manganese stains and ped faces with chroma of 3 or less. The horizon is loam to silty clay loam in the fine-earth fraction. It has weak or moderate, medium or coarse subangular blocky structure; coarse or very coarse prismatic structure parting to platy; or thin or medium platy structure. Consistence is friable or firm. Reaction is very strongly acid to medium acid.

The C horizon has hue of 10YR through 2.5Y, value of 4 or 5, and chroma of 2 or 3 and has few to many mottles. It is loam to silty clay loam in the fine-earth fraction. It is massive or has platy structure inherited from the weathering bedrock. Reaction is strongly acid or medium acid.

Hamlin series

The Hamlin series consists of deep, well drained soils on flood plains in valleys. The soils formed in post-glacial alluvial deposits that have a high silt content. Slopes range from 0 to 3 percent.

Hamlin soils commonly are near moderately well drained and somewhat poorly drained Teel soils and poorly drained and very poorly drained Wayland soils on flood plains and are near but lower than Chenango, Unadilla, Scio, Raynham, and Canandaigua soils on terraces above the flood plain.

Typical pedon of Hamlin silt loam, low bottom, in the town of Greene, 900 feet south of NY Route 12, and 65 feet west of Hogsback Road:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam; weak medium granular structure; friable; many fine roots; neutral; abrupt wavy boundary.

B21—9 to 24 inches; brown (10YR 4/3) silt loam; moderate medium subangular blocky structure; friable; common fine roots; many medium and coarse pores; neutral; gradual wavy boundary.

B22—24 to 38 inches; dark brown (10YR 3/3) silt loam; weak coarse subangular blocky structure; friable; few fine roots; few coarse roots; slightly acid; gradual wavy boundary.

C—38 to 60 inches; dark brown (10YR 4/3) very fine sandy loam; common medium faint gray (10YR 5/1) mottles; massive; friable; few fine roots; many fine and common coarse pores; old voids have gray (10YR 5/1) filling and strong brown (7.5YR 5/8) borders; medium acid.

The solum thickness ranges from 24 to 40 inches. The depth to carbonates and strongly contrasting material is more than 40 inches, and the depth to bedrock is more than 60 inches.

The Ap horizon has hue of 5YR through 10YR, value of 3 or 4, and chroma of 1 through 3. The fine-earth fraction is very fine sandy loam or silt loam. Consistence is very friable or friable. The content of rock fragments ranges from 0 to 5 percent. Reaction is strongly acid to neutral.

The B2 horizon has hue of 5YR through 10YR, value of 3 through 5, and chroma of 2 through 4. The fine-earth fraction is very fine sandy loam or silt loam. Structure is granular, subangular blocky, or prismatic. The content of rock fragments ranges from 0 to 5 percent. The B21 horizon is strongly acid to neutral, and the B22 horizon is strongly acid to slightly acid.

The C horizon has hue of 5YR through 10YR, value of 3 through 5, and chroma of 2 through 4. The fine-earth fraction is very fine sandy loam or silt loam. The soil is massive or has platy structure. The content of rock fragments ranges from 0 to 10 percent. Reaction is strongly acid or medium acid.

The Hamlin soils in this survey area are a taxadjunct to the Hamlin series because they have a lower base saturation above a depth of 30 inches and more acid in the substratum than defined for the range of the series. These differences do not affect use and management of these soils.

Howard series

The Howard series consists of deep, well drained to somewhat excessively drained soils on outwash plains, terraces, kames, and deltas. These soils formed in sand and gravel deposits derived from glacial outwash. Slopes range from 0 to 35 percent.

Howard soils commonly are near and form a drainage sequence with moderately well drained Phelps soils and poorly drained and very poorly drained Atherton soils. Howard soils are near Arkport and Chenango soils but have a higher gravel content than the Arkport soils and are on lower terraces than the Chenango soils.

Typical pedon of Howard gravelly loam, 3 to 8 percent slopes, in the town of North Norwich, 2 miles north of the intersection of New York Route 12 and County Route 23 and 660 feet west of County Route 23:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) gravelly loam; moderate medium and fine granular structure; very friable; many fine and few medium roots; 15 percent coarse fragments; slightly acid; abrupt smooth boundary.

B2—10 to 20 inches; dark yellowish brown (10YR 4/4) gravelly loam; moderate medium and fine subangular blocky structure; friable; many fine and few medium roots; common fine and few large pores; 25 percent coarse fragments; strongly acid; abrupt wavy boundary.

IIA&B—20 to 24 inches; pale brown (10YR 6/3) (A part) and dark brown (10YR 4/3) (B part) very gravelly loam; weak medium subangular blocky structure; friable; common fine roots; common medium and many fine pores; 40 percent coarse fragments; medium acid; gradual wavy boundary.

IIB&A—24 to 28 inches; dark brown (10YR 3/3) (B part) and pale brown (10YR 6/3) (A part) very gravelly loam; weak medium and fine subangular blocky structure; friable; common fine roots; common medium and many fine pores, many have clay films; 50 percent coarse fragments, some coated with clay films; neutral; gradual wavy boundary.

IIB21t—28 to 35 inches; dark brown (10YR 3/3) very gravelly loam; weak medium and fine subangular blocky structure; friable; common fine roots; common medium and many fine pores; many clay films; common pale brown (10YR 6/3) skeletans; 50 percent coarse fragments, some coated with clay films; neutral; gradual wavy boundary.

IIB22t—35 to 51 inches; dark yellowish brown (10YR 3/4) very gravelly loam; weak medium subangular blocky structure; friable; few fine roots; many medium and few large pores, some with clay films; 60 percent coarse fragments; clay bridging between and around pebbles; neutral; clear wavy boundary.

IIIC—51 to 80 inches; dark brown (10YR 3/3) very gravelly coarse sandy loam; crudely stratified; single grain; loose; few roots in upper part; clay bridging between some sand grains; 70 percent coarse fragments; strongly effervescent; mildly alkaline.

The solum thickness and the depth to carbonates are 24 to 60 inches. The depth to bedrock is more than 60 inches.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 2 or 3. The fine-earth fraction is sandy loam, loam, or silt loam. Consistence is very friable or friable. The content of rock fragments ranges from 5 to 35 percent. Reaction is strongly acid to neutral.

The B2 horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 6. The fine-earth fraction is sandy loam to silt loam. Structure is subangular blocky, or the soil is massive. Consistence is friable or firm. The content of rock fragments ranges from 15 to 60 percent. Reaction is strongly acid to neutral. Some pedons do not have a B2 horizon but have an A2 horizon that has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 2 or 3.

The A&B and B&A horizons have hue of 5YR through 10YR, value of 3 through 6, and chroma of 2 through 6. The fine-earth fraction is sandy loam to silt loam. Consistence is friable or firm. The content of rock fragments ranges from 35 to 65 percent. Reaction is strongly acid to neutral.

The B2t horizon has hue of 5YR through 10YR, value of 3 or 4, and chroma of 2 through 4. The fine-earth fraction is sandy loam or silt loam to sandy clay loam. Structure is angular blocky or subangular blocky. Consistence is friable or firm. The content of rock fragments ranges from 35 to 65 percent. Reaction is strongly acid to neutral.

The C horizon has hue of 5YR through 10YR, value of 3 through 6, and chroma of 2 through 4. Some pedons have high-chroma mottles. The fine-earth fraction is coarse sandy loam to sand and commonly is stratified. The content of rock fragments ranges from 50 to 75 percent. Reaction is neutral to moderately alkaline.

Lackawanna series

The Lackawanna series consists of deep, well drained soils on uplands. The soils formed in loamy glacial till derived from reddish siltstone, shale, and sandstone. Slopes range from 3 to 35 percent.

Lackawanna soils commonly are near and form a drainage sequence with more poorly drained Wellsboro, Morris, and Norwich soils and are near moderately deep Oquaga and Lordstown soils and shallow Arnot soils.

Typical pedon of Lackawanna channery silt loam, 3 to 8 percent slopes, in the town of Oxford, 0.4 mile west of the intersection of County Route 3 and Painter Hill Road and 75 feet south of County Route 3:

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) channery silt loam; weak fine granular structure; very friable; many fine and common medium roots; 30 percent coarse fragments; very strongly acid; clear wavy boundary.

B21—5 to 18 inches; dark brown (7.5YR 4/4) channery silt loam; moderate medium granular structure; very friable; many fine and common medium roots; many fine pores; 30 percent coarse fragments; strongly acid; gradual wavy boundary.

B22—18 to 30 inches; dark brown (7.5YR 4/4) channery silt loam; weak fine subangular blocky structure; friable; common coarse and many fine roots; many fine pores with thin clay linings; 25 percent coarse fragments; strongly acid; abrupt wavy boundary.

A'2—30 to 33 inches; brown (10YR 5/3) very channery loam; few fine faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; firm; few fine roots; common fine pores; 40 percent coarse fragments; strongly acid; clear wavy boundary.

B'x1—33 to 49 inches; dark reddish brown (5YR 3/3) channery silt loam; common medium prominent pale brown (10YR 6/3) mottles; strong very coarse prismatic structure; prisms 12 to 24 inches across separated by light gray (10YR 7/2) silt wedges 1 to 2 inches thick with borders of strong brown (7.5YR 5/8); very firm and brittle; common medium pores and few clay linings; few thin clay films; 30 percent coarse fragments; strongly acid; clear wavy boundary.

B'x2—49 to 60 inches; reddish brown (5YR 4/3) channery silt loam; weak very coarse prismatic structure parting to weak medium platy; firm and brittle; few fine pores; 25 percent coarse fragments; medium acid.

The solum thickness ranges from 40 to 75 inches. The depth to bedrock is more than 60 inches, and the depth to the fragipan ranges from 17 to 36 inches.

The A horizon has hue of 5YR or 10YR, value of 3 or 4, and chroma of 2 through 4. The fine-earth fraction is loam or silt loam. Consistence is friable or very friable. The content of rock fragments ranges from 15 to 35 percent. Reaction is very strongly acid or strongly acid.

The B horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 4 through 6. The fine-earth fraction is loam or silt loam. Structure is subangular blocky or granular. Consistence is friable or very friable. The content of rock fragments ranges from 10 to 45 percent. Reaction is very strongly acid or strongly acid.

The A'2 horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2 or 3. The fine-earth fraction is loam or silt loam. Structure is platy or subangular blocky, or the soil is massive. Consistence is friable or firm. The content of rock fragments ranges from 10 to 40 percent. Reaction is very strongly acid or strongly acid.

The Bx horizon has hue of 10R through 5YR, value of 3 or 4, and chroma of 3 or 4. The fine-earth fraction is loam, silt loam, or sandy loam. Structure is very coarse prismatic, and in some horizons it parts to platy or subangular blocky. The content of rock fragments ranges from 10 to 45 percent. Reaction is very strongly acid to medium acid.

Some pedons have a C horizon that has the same color and texture as the Bx horizon.

Lansing series

The Lansing series consists of deep, well drained soils on glaciated uplands. The soils formed in loamy glacial till derived from siltstone, shale, sandstone, and limestone. Slopes range from 3 to 25 percent.

Lansing soils commonly are near Howard soils, which formed in sand and gravel deposits, and Bath and Valois soils, which have less clay and silt in the subsoil than the Lansing soils.

Typical pedon of Lansing gravelly silt loam, 3 to 8 percent slopes, in the town of Sherburne, 800 feet

southwest of New York State Route 80, and 1,320 feet northwest of Cush Hill Road:

Ap—0 to 9 inches; dark brown (10YR 4/3) gravelly silt loam; moderate medium granular structure; friable; many fine roots; many fine pores; 15 percent coarse fragments; medium acid; abrupt smooth boundary.
A2—9 to 15 inches; pale brown (10YR 6/3) gravelly silt loam; weak medium subangular blocky structure; friable; many fine roots; many fine pores; 15 percent coarse fragments; strongly acid; clear wavy boundary.
B&A—15 to 28 inches; yellowish brown (10YR 5/4) (B part) and pale brown (10YR 6/3) (A part) gravelly silt loam; patchy clay films in pores in the B part; moderate medium subangular blocky structure; friable; many fine roots; many fine pores; 15 percent coarse fragments; slightly acid; gradual wavy boundary.
B21t—28 to 37 inches; brown (10YR 5/3) gravelly silt loam; strong coarse subangular blocky structure; firm; common fine roots; common fine pores with common clay films; common clay films on ped faces; 25 percent coarse fragments; slightly acid; gradual wavy boundary.
B22t—37 to 48 inches; dark brown (10YR 4/3) gravelly silt loam; strong coarse subangular blocky structure; firm; common fine roots; many fine pores with many clay films; many clay films on ped faces; 25 percent coarse fragments; neutral; abrupt wavy boundary.
C—48 to 60 inches; grayish brown (10YR 5/2) gravelly loam; massive; firm; few fine roots; common fine pores; 30 percent coarse fragments; strongly effervescent; moderately alkaline.

The solum thickness ranges from 32 to 60 inches and the depth to carbonates from 30 to 60 inches. The depth to bedrock is more than 60 inches.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 2 or 3. The fine-earth fraction is very fine sandy loam, loam, or silt loam. The content of rock fragments ranges from 15 to 35 percent. Reaction is strongly acid to neutral.

The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 2 through 4. The fine-earth fraction is very fine sandy loam, loam, or silt loam. Structure is platy or subangular blocky. The content of rock fragments ranges from 2 to 45 percent. Reaction is strongly acid to neutral. Some pedons do not have an A2 horizon.

The B&A horizon has hue of 10YR, value of 3 through 6, and chroma of 2 through 4. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 2 to 45 percent. Reaction is strongly acid to neutral.

The Bt horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 3 or 4. Some pedons have high-chroma mottles in the B22t horizon. The fine-earth fraction is loam, silt loam, or silty clay loam. Consistence is friable or firm. The content of rock fragments ranges from 2 to 45 percent. Reaction is strongly acid to neutral.

The C horizon has hue of 10YR through 5Y, value of 3 through 5, and chroma of 1 through 3. The fine-earth fraction is loam or silt loam. Structure is platy, or the soil is massive. Consistence is firm or very firm. The content of rock fragments ranges from 15 to 50 percent. Reaction is neutral to moderately alkaline, and the soil commonly contains free carbonates.

Lordstown series

The Lordstown series consists of moderately deep, well drained soils on glaciated uplands. The soils formed in glacial till derived from siltstone, shale, and sandstone. Slopes range from 3 to 50 percent.

Lordstown soils commonly are near and form a drainage sequence with somewhat poorly drained and poorly drained Greene soils and are near shallow Arnot and Tuller soils and deep Valois, Bath, Mardin, and Volusia soils.

Typical pedon of Lordstown channery silt loam, 3 to 8 percent slopes, in the town of Sherburne, 1.25 miles east of New York Route 12, and 1,000 feet north of Granville Hill Road:

Ap—0 to 9 inches; dark brown (10YR 3/3) channery silt loam; weak medium subangular blocky structure parting to moderate medium granular; friable; many fine and few medium roots; 20 percent coarse fragments; medium acid; abrupt wavy boundary.
B21—9 to 16 inches; yellowish brown (10YR 5/6) channery silt loam; moderate medium and fine subangular blocky structure; very friable; many fine roots; common fine pores; 15 percent coarse fragments; strongly acid; gradual wavy boundary.
B22—16 to 20 inches; brown (10YR 4/3) channery silt loam; moderate medium and fine subangular blocky structure; friable; common fine roots; common fine and medium pores; 15 percent coarse fragments; strongly acid; clear smooth boundary.
C—20 to 24 inches; grayish brown (10YR 5/2) channery loam; weak medium and thin platy structure; firm; few fine roots; few fine pores; 25 percent coarse fragments; strongly acid; clear distinct boundary.
R—24 inches; dark gray (N 4/0) fine grained sandstone.

The solum thickness and depth to bedrock range from 20 to 40 inches.

The A horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 through 4. The fine-earth fraction is loam or silt loam. Consistence is very friable or friable. The content of rock fragments ranges from 15 to 35 percent. Reaction is very strongly acid to slightly acid.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 3 through 6. The fine-

earth fraction is loam or silt loam. Structure is subangular blocky or granular. Consistence is very friable or friable. The content of rock fragments ranges from 15 to 35 percent. Reaction is very strongly acid to medium acid.

The C horizon has hue of 7.5YR through 5Y, value of 4 through 6, and chroma of 2 through 4. The fine-earth fraction is fine sandy loam to silt loam. Structure is platy, or the soil is massive. Consistence is friable or firm. The content of rock fragments ranges from 20 to 60 percent. Reaction is strongly acid or medium acid.

The R horizon is thick to thin beds of siltstone or sandstone or is siltstone interbedded with shale. The rock is jointed and commonly is fractured along joint planes in the upper 3 to 6 feet.

Mardin series

The Mardin series consists of deep, moderately well drained soils on uplands. The soils formed in loamy glacial till derived from siltstone, shale, and sandstone. Slopes range from 0 to 35 percent.

Mardin soils commonly are near and form a drainage sequence with somewhat poorly drained Volusia soils, poorly drained to very poorly drained Chippewa soils, and well drained Bath soils. Mardin soils are also near Valois and Alden soils, neither of which has a fragipan, and Lordstown, Arnot, and Tuller soils, which are shallow or moderately deep to bedrock.

Typical pedon of Mardin channery silt loam, 3 to 8 percent slopes, in the town of New Berlin, 4,400 feet northeast of King Settlement Road, and 100 feet east of Dilly Hill Road:

Ap—0 to 6 inches; dark brown (10YR 4/3) channery silt loam; moderate medium granular structure; friable; many fine roots; 20 percent coarse fragments; slightly acid; abrupt smooth boundary.

B21—6 to 12 inches; yellowish brown (10YR 5/4) channery silt loam; weak fine and medium subangular blocky structure; friable; many fine roots; few fine pores; 15 percent coarse fragments; medium acid; clear wavy boundary.

B22—12 to 16 inches; pale brown (10YR 6/3) channery silt loam; common medium faint yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; common fine roots; few fine pores; 15 percent coarse fragments; medium acid; clear wavy boundary.

Bx1—16 to 28 inches; grayish brown (10YR 5/2) channery loam; strong very coarse prismatic structure separated by gray (10YR 6/1) wedges with strong brown (7.5YR 5/6) outer rims; very firm, brittle; few roots between prisms; common medium and fine pores with thin clay and silt linings; 20 percent coarse fragments; strongly acid; clear wavy boundary.

Bx2—28 to 46 inches; brown (10YR 5/3) channery silt loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate very coarse prismatic structure separated by gray (10YR 6/1) wedges with strong brown (7.5YR 5/6) outer rims; very firm, brittle; common fine pores with thin clay linings; 25 percent coarse fragments; medium acid; gradual wavy boundary.

C—46 to 60 inches; brown (10YR 5/3) very channery loam; few fine faint gray (10YR 5/1) mottles; massive; very firm; 35 percent coarse fragments; neutral.

The solum thickness ranges from 40 to 70 inches. The depth to bedrock is more than 60 inches, and the depth to the fragipan ranges from 14 to 26 inches.

The A horizon has hue of 7.5YR through 2.5Y, value of 3 or 4, and chroma of 2 through 4. The fine-earth fraction is loam or silt loam. Consistence is very friable or friable. The content of rock fragments ranges from 5 to 35 percent. Reaction is extremely acid to slightly acid.

The B2 horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 3 through 8. The fine-earth fraction is loam or silt loam. Structure is granular or subangular blocky. Consistence is very friable to firm. The content of rock fragments ranges from 5 to 35 percent. Reaction is extremely acid to slightly acid.

The Bx horizon has hue of 7.5YR through 5Y, value of 3 through 5, and chroma of 2 through 4. The fine-earth fraction is loam or silt loam. Structure is weak through strong prismatic, and in some pedons it parts to weak platy or subangular blocky. Consistence is firm or very firm and is brittle. The content of rock fragments ranges from 15 to 60 percent. Reaction is very strongly acid to neutral.

The C horizon has hue of 7.5YR through 5Y, value of 3 through 5, and chroma of 2 through 4. The fine-earth fraction is loam or silt loam. Structure is platy, or the soil is massive. Consistence is firm or very firm. The content of rock fragments ranges from 20 to 60 percent. Reaction is strongly acid to moderately alkaline.

Morris series

The Morris series consists of deep, somewhat poorly drained soils on uplands. The soils formed in loamy glacial till derived from red siltstone, shale, and sandstone. Slopes range from 0 to 15 percent.

Morris soils commonly are near and form a drainage sequence with poorly drained and very poorly drained Norwich soils, moderately well drained Wellsboro soils, and well drained Lackawanna soils. Morris soils also are near Arnot, Lordstown, Oquaga, and Tuller soils, all of which are shallower to bedrock than the Morris soils. Morris soils are of redder hue than the similar Volusia soils.

Typical pedon of Morris channery silt loam, in an area of Volusia and Morris very stony silt loams, 3 to 10 percent slopes, in the town of Plymouth, 1.8 miles from the intersection of Moon Hill Road and State route 23,

2,000 feet west on old CCC truck trail and 300 feet north of trail:

O2—1 inch to 0; very dark brown (10YR 2/2) humus in a mat of roots and fungal hyphae; many fine roots; 5 percent coarse fragments; strongly acid; abrupt smooth boundary.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) channery silt loam; weak fine granular structure; very friable; many fine and few medium roots; 15 coarse fragments; common fine distinct strong brown (7.5YR 5/8) stains from decayed roots; very strongly acid; clear wavy boundary.

B2—3 to 15 inches; grayish brown (10YR 5/2) channery silt loam; common medium faint pale brown (10YR 6/3) mottles and common fine distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine pores; 20 percent coarse fragments; very strongly acid; clear wavy boundary.

Bx1—15 to 42 inches; reddish brown (5YR 4/4) channery silt loam; few fine distinct strong brown (7.5YR 5/6) mottles; moderate very coarse prismatic structure; firm and slightly brittle; many fine and common medium pores; reddish gray (5YR 5/2) clay linings in pores and coating some coarse fragments; reddish gray (5YR 5/2) prism faces; 25 percent coarse fragments; medium acid; diffuse wavy boundary.

Bx2—42 to 63 inches; reddish brown (2.5YR 4/4) channery silt loam; moderate very coarse prismatic structure; firm and slightly brittle; few medium pores; thin clay linings in some pores; reddish gray (5YR 5/2) ped faces; 25 percent coarse fragments; medium acid.

The solum thickness ranges from 40 to 70 inches. The depth to bedrock is more than 60 inches, and the depth to the fragipan ranges from 10 to 20 inches.

The A1 horizon has hue of 5YR through 10YR, value of 3 or 4, and chroma of 1 or 2. Some pedons have an Ap horizon that has hue of 5YR through 10YR, value of 3 through 5, and chroma of 1 through 4. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 10 to 35 percent. Reaction is very strongly acid to medium acid.

Some pedons have an A2 horizon that has hue of 5YR through 10YR, value of 3 through 6, and chroma of 2 or 3. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 10 to 35 percent. Reaction is very strongly acid to medium acid.

The B2 horizon has hue of 5YR through 10YR, value of 3 through 7, and chroma of 2 through 6. The fine-earth fraction is loam or silt loam. Structure is platy or subangular blocky. The content of rock fragments ranges from 10 to 35 percent. Reaction is very strongly acid to medium acid.

The Bx horizon has hue of 2.5YR through 7.5YR, value of 4 or 5, and chroma of 2 through 6. The fine-earth fraction is loam to silty clay loam. The structure is moderate, very coarse prismatic parting to very weak to moderate subangular blocky, or the material within the prisms is massive. Consistence is firm or very firm. The content of rock fragments ranges from 15 to 35 percent. Reaction is very strongly acid to slightly acid.

Some pedons have a C horizon that has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 2 through 6. The fine-earth fraction is loam or silt loam. Structure is subangular blocky, or the soil is massive. The content of rock fragments ranges from 15 to 50 percent. Reaction is strongly acid to slightly acid.

Norwich series

The Norwich series consists of deep, poorly drained and very poorly drained soils in depressions on uplands. The soils formed in loamy glacial till derived from red siltstone, shale, and sandstone. Slopes range from 0 to 3 percent.

Norwich soils in Chenango County are mapped only with Chippewa soils but are of redder hue than the Chippewa soils. Norwich soils commonly are near and form a drainage sequence with better drained Morris, Wellsboro, and Lackawanna soils and are near shallower Oquaga, Tuller, Greene, and Lordstown soils.

Typical pedon of Norwich silt loam, in an area of Chippewa and Norwich soils, in the town of Oxford, 0.42 mile northeast of County Route 27 and 1/2 mile west of Bradley Hill Road:

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam; moderate medium granular structure; friable; many fine roots; 5 percent coarse fragments; strongly acid; abrupt smooth boundary.

IIA2g—9 to 15 inches; grayish brown (2.5Y 5/2) channery silt loam; common coarse prominent yellowish brown (10YR 5/6) mottles and few fine distinct gray (5Y 6/1) mottles; weak medium and weak fine subangular blocky structure; friable; few fine roots; common medium pores; 20 percent coarse fragments; strongly acid; clear wavy boundary.

IIIBx1g—15 to 26 inches; brown (7.5YR 5/2) channery silt loam; many coarse distinct yellowish brown (10YR 5/6) and gray (5YR 5/1) mottles; strong very coarse prismatic structure parting to weak medium blocky; very firm, brittle; few roots between prisms; few medium and few coarse pores with clay linings; prism faces have gray (5Y 5/1) silt coats; 15 percent coarse fragments; slightly acid; gradual wavy boundary.

IIIBx2g—26 to 60 inches; dark reddish gray (5YR 4/2) channery silt loam; few coarse distinct yellowish brown (10YR 5/6) and very dark gray (5YR 3/1) mottles; strong very coarse prismatic structure parting to weak medium blocky; firm, brittle; many medium pores lined with clay; reddish gray (5YR

5/2) ped faces with few patchy clay films; 15 percent coarse fragments; slightly acid.

The solum thickness ranges from 36 to 62 inches. The depth to bedrock is more than 60 inches. The fragipan is at a depth of 10 to 24 inches.

The Ap horizon has hue of 7.5YR or 10YR, value of 2 through 4, and chroma of 1 or 2. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 0 to 15 percent. Reaction is strongly acid to slightly acid.

The A2g horizon has hue of 2.5Y through 5YR, value of 4 through 6, and chroma of 1 or 2. The fine-earth fraction is silt loam or loam. Structure is subangular blocky, or the soil is massive. The content of rock fragments ranges from 5 to 35 percent. Reaction is strongly acid to slightly acid. Some pedons have a B2g horizon.

The Bx horizon has hue of 2.5YR through 7.5YR, value of 4 or 5, and chroma of 1 through 3. The fine-earth fraction is silt loam, loam, or sandy loam. Structure is prismatic parting to blocky, or the soil is massive. Consistence is firm or very firm. The content of rock fragments ranges from 15 to 45 percent. Reaction is strongly acid to slightly acid.

Some pedons have a C horizon that is similar to the Bx horizon in color and texture but is less brittle. Structure is platy, or the soil is massive. The content of rock fragments ranges from 15 to 45 percent. Reaction is strongly acid to neutral.

Oquaga series

The Oquaga series consists of moderately deep, well drained to excessively drained soils that formed in glacial till deposits derived mainly from red shale and sandstone. Slopes range from 3 to 35 percent.

Oquaga soils are near Lackawanna, Wellsboro, Morris, and Norwich soils but are shallower to bedrock than the Lackawanna or Wellsboro soils and are better drained than and not so deep to bedrock as the Morris or Norwich soils. Oquaga soils commonly are near the brown Lordstown soils and the somewhat poorly drained and poorly drained Tuller soils.

Typical pedon of Oquaga channery silt loam, in an area of Oquaga and Lordstown very stony silt loams, 8 to 15 percent slopes, in the town of Guilford, 4,400 feet west of New York Route 8, and 1,450 feet north of County Route 37:

O1—2 inches to 0; dark reddish brown (5YR 2/2) hardwood leaves and twigs over partially decomposed and well decomposed forest litter.

A1—0 to 3 inches; dark reddish brown (5YR 3/3) channery silt loam; weak fine granular structure; very friable; many fine and common medium roots; 15 percent coarse fragments; very strongly acid; clear wavy boundary.

A2—3 to 7 inches; red (2.5YR 4/6) channery silt loam; weak fine granular structure; very friable; many fine and common medium roots; 15 percent coarse fragments; strongly acid; clear smooth boundary.

B21—7 to 15 inches; reddish brown (2.5YR 4/4) channery silt loam; weak fine and medium subangular blocky structure; friable; many fine and few medium roots; few fine pores; 25 percent coarse fragments; strongly acid; clear wavy boundary.

B22—15 to 25 inches; reddish brown (2.5YR 4/4) very channery silt loam; moderate medium subangular blocky structure; friable; common fine roots; common fine pores; 35 percent coarse fragments; strongly acid; abrupt smooth bounday.

B23—25 to 29 inches; reddish brown (2.5YR 5/4) very channery silt loam; moderate fine and medium subangular blocky structure; firm; common fine pores; 65 percent coarse fragments; strongly acid; clear wavy boundary.

IIR—29 inches; reddish gray (10R 6/1) coarsely fractured shale.

The solum thickness ranges from 16 to 30 inches and the depth to bedrock from 20 to 40 inches.

The A1 horizon has hue of 2.5YR through 10YR, value of 3 or 4, and chroma of 2 through 4. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 15 to 35 percent. Reaction is extremely acid to medium acid.

The B horizon has hue of 2.5YR through 7.5YR, value of 4 through 6, and chroma of 3 through 8. In some pedons the lower part of the B horizon has high-chroma mottles. The fine-earth fraction is silt loam or loam. Structure is subangular blocky or granular. Consistence is very friable to firm. The content of rock fragments ranges from 25 to 70 percent. Reaction is extremely acid to medium acid.

Some pedons have a C horizon that has hue of 10R through 7.5YR, value of 3 through 5, and chroma of 2 through 4. The fine-earth fraction is silt loam or loam. The content of rock fragments ranges from 35 to 80 percent. Reaction is extremely acid to medium acid.

The IIR horizon is shale or sandstone bedrock, and the rock commonly is interbedded.

Phelps series

The Phelps series consists of deep, moderately well drained soils in valleys on terraces. The soils formed in gravelly glacial outwash deposits. Slopes range from 0 to 8 percent.

Phelps soils and somewhat excessively drained to well drained Howard soils formed in the same kind of parent material. Hamlin and Teel soils are on nearby flood plains.

Typical pedon of Phelps gravelly silt loam, 0 to 3 percent slopes, in the town of Sherburne, 1/2 mile north-

west of County Route 23 and 1,700 feet east of N.Y. Route 80:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) gravelly silt loam, pinkish gray (7.5YR 6/2) dry; moderate medium granular structure; friable; many fine roots; 20 percent coarse fragments; neutral; abrupt wavy boundary.

B&A—9 to 15 inches; brown (10YR 5/3) (B part) gravelly loam; common fine faint dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; friable; common fine roots; common fine pores; 1/10 inch thick grayish brown (10YR 5/2) A material between peds; clay linings in some pores; 15 percent coarse fragments; neutral; clear wavy boundary.

B2t—15 to 32 inches; dark brown (7.5YR 4/4) gravelly loam; common fine faint dark brown (7.5YR 3/2) mottles; moderate medium subangular blocky structure; friable; common fine roots; few thin skeletans; thin patchy clay films on ped faces and in pores in upper 6 inches; 25 percent coarse fragments; neutral; clear wavy boundary.

IIC—32 to 60 inches; very dark grayish brown (10YR 3/2) stratified sand and gravel; single grain; loose; few fine roots; 50 percent coarse fragments; slightly effervescent; mildly alkaline.

The solum thickness ranges from 28 to 36 inches and depth to carbonates from 30 to 36 inches. The depth to bedrock is more than 60 inches.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. The fine-earth fraction is fine sandy loam, loam, or silt loam. The content of rock fragments ranges from 15 to 35 percent. Reaction is medium acid to neutral.

The B&A horizon has hue of 5YR through 10YR, value of 3 through 5, and chroma of 3 or 4 in the B part; and hue of 5YR through 10YR, value of 5 or 6, and chroma of 2 or 3 in the A part. The fine-earth fraction is loam, silt loam, or clay loam. The content of rock fragments ranges from 5 to 35 percent. Reaction is medium acid to neutral.

The B2t horizon has hue of 5YR through 2.5Y, value of 3 through 5, and chroma of 3 or 4. The fine-earth fraction is loam, silt loam, or clay loam. Rock fragments make up 5 to 35 percent of the volume. Reaction is medium acid to neutral.

The IIC horizon has hue of 5YR through 10YR, value of 3 through 5, and chroma of 2 through 4. The fine-earth fraction mainly is sand or loamy sand. In places, the horizon is stratified gravel and sand. The content of rock fragments ranges from 35 to 70 percent. Reaction is mildly alkaline or moderately alkaline.

Raynham series

The Raynham series consists of deep, somewhat poorly drained and poorly drained soils in valleys and lowland depressions. The soils formed in water-deposited sediments high in silt content. Slope ranges from 0 to 3 percent.

Raynham soils and poorly drained and very poorly drained Canandaigua soils formed in similar kinds of parent material. Raynham soils are near Red Hook soils but do not have gravel in the lower part of the subsoil and substratum as do the Red Hook soils. Raynham soils also are near better drained Unadilla and Scio soils and gravelly Howard soils.

Typical pedon of Raynham silt loam, in the town of New Berlin, 1,650 feet south of N.Y. Route 23, and 100 feet west of N.Y. Route 8:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many fine roots; common fine distinct dark brown (7.5YR 4/4) organic stains; strongly acid; abrupt smooth boundary.

B21—7 to 12 inches; light brownish gray (2.5Y 6/2) silt loam; many medium prominent strong brown (7.5YR 5/8) mottles; moderate medium and coarse subangular blocky structure; friable; few fine roots; few fine pores; very strongly acid; clear wavy boundary.

B22—12 to 37 inches; grayish brown (10YR 5/2) silt loam; many fine and medium distinct strong brown (7.5YR 5/8) and dark brown (7.5YR 4/4) mottles; moderate very coarse prismatic structure; prisms are 4 to 20 inches across; firm; few fine roots; common fine pores, some with thin clay linings; dark gray (5YR 4/1) prism faces; very strongly acid; gradual wavy boundary.

IIC1—37 to 48 inches; dark brown (10YR 4/3) sandy loam; common medium faint yellowish brown (10YR 5/6) mottles and few fine faint gray (10YR 5/1) mottles; massive; firm, slightly sticky; very strongly acid; clear wavy boundary.

IIC2—48 to 60 inches; dark gray (N 4/0) sandy loam; massive; friable, slightly sticky; very strongly acid.

The solum thickness ranges from 20 to 37 inches. The content of rock fragments ranges from 0 to 2 percent within a depth of 40 inches. The depth to bedrock is more than 60 inches.

The Ap horizon has hue of 10YR or 2.5YR, value of 2 through 4, and chroma of 1 through 3. The fine-earth fraction is silt loam or very fine sandy loam. Unless limed, the soil is strongly acid or very strongly acid.

The B horizon has hue of 7.5YR through 5Y, value of 4 through 6, and chroma of 2 through 4. Mottles are distinct or prominent. The fine-earth fraction is silt loam, silt, or very fine sandy loam. Structure is platy, blocky, or prismatic. Reaction is strongly acid or very strongly acid.

The IIC horizon is neutral or has hue of 7.5YR through 5Y, value of 4 through 6, and chroma of 0 through 3. The fine-earth fraction mainly is silt to sandy loam. Thin strata of fine sand are in some pedons, and some pedons have clayey or sandy layers below a depth of 40 inches. Reaction is strongly acid or very strongly acid.

The Raynham soils in the survey area are a taxadjunct to the Raynham series because they are more acid throughout the soil and have a substratum of sandy loam. These differences do not affect use and management of the soils.

Red Hook series

The Red Hook series consists of deep, somewhat poorly drained soils. The soils formed in water-sorted deposits in low areas on glacial outwash terraces, stream terraces, and margins of alluvial fans. Slopes range from 0 to 3 percent.

Red Hook soils and moderately well drained Castile soils and poorly drained and very poorly drained Atherton soils formed in the same kind of parent materials. Red Hook soils are near better drained Chenango and Howard soils.

Typical pedon of Red Hook silt loam, in the town of Sherburne, 350 feet west of Williams Road and 50 feet north of South Cross Road:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable; many fine roots; 5 percent coarse fragments; slightly acid; abrupt smooth boundary.

B21—9 to 14 inches; yellowish brown (10YR 5/4) silt loam; few fine faint gray (10YR 5/1) mottles; weak medium and fine subangular blocky structure; friable; common fine roots; 10 percent coarse fragments; slightly acid; clear wavy boundary.

B22—14 to 19 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak fine and medium subangular blocky structure; friable; common fine roots; 10 percent coarse fragments; slightly acid; clear wavy boundary.

B23—19 to 27 inches; grayish brown (10YR 5/2) gravelly silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak prismatic structure parting to weak medium subangular blocky; friable; few fine roots; 15 percent coarse fragments; slightly acid; clear wavy boundary.

IIC1—27 to 38 inches; grayish brown (2.5Y 5/2) very gravelly loam; single grain; loose; 60 percent coarse fragments; neutral; clear wavy boundary.

IIIC2—38 to 60 inches; grayish brown (2.5Y 5/2) gravelly sandy loam; single grain; massive; 15 percent coarse fragments; neutral.

The solum thickness ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 through 4, and chroma of 2 or 3. The fine-earth fraction is fine sandy loam, loam, or silt loam. The content of rock fragments ranges from 5 to 15 percent. Reaction is strongly acid to slightly acid.

The B horizon has hue of 7.5YR through 5Y, value of 4 through 6, and chroma of 1 through 4. Mottles are faint to prominent. The fine-earth fraction is sandy loam, loam, or silt loam. Structure is weak or moderate, fine to coarse, subangular blocky or platy. The content of rock fragments ranges from 10 to 55 percent. Reaction is medium acid to neutral.

The C horizon has hue of 7.5YR through 5Y, value of 3 through 5, and chroma of 1 through 3. The fine-earth fraction is sandy loam to silt loam. The content of rock fragments in some subhorizons of the C horizon is as much as 60 percent. Reaction is medium acid to mildly alkaline.

Riverhead series

The Riverhead series consists of deep, well drained soils in valley areas on terraces and deltas. The soils formed in sandy glacial outwash deposits. Slopes range from 3 to 15 percent.

Riverhead soils are near Unadilla soils that have a high silt content, moderately well drained Scio and Castile soils, well drained Arkport soils, and gravelly Chenango soils.

Typical pedon of Riverhead fine sandy loam, 8 to 15 percent slopes, in the town of Bainbridge, 3,800 feet southeast of County Road 39, and 1/4 mile west of NY Route 206:

Ap—0 to 8 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; 10 percent coarse fragments; strongly acid; abrupt smooth boundary.

B21—8 to 16 inches; dark brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; common coarse roots; 10 percent coarse fragments; strongly acid; clear wavy boundary.

B22—16 to 20 inches; reddish brown (5YR 5/3) fine sandy loam; weak medium subangular blocky structure; friable; common fine roots; 15 percent coarse fragments; strongly acid; gradual wavy boundary.

B3—20 to 28 inches; dark brown (7.5YR 3/2) fine sandy loam; massive; friable; common fine roots; 15 percent coarse fragments; strongly acid; abrupt wavy boundary.

IIC—28 to 60 inches; dark brown (7.5YR 3/2) medium and coarse sand; single grain; loose; few fine roots; 10 percent coarse fragments; medium acid.

The solum thickness ranges from 22 to 36 inches. The depth to bedrock is more than 60 inches.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Some pedons have a thin A1 horizon with hue of 10YR, value of 2 through 4, and chroma of 1 or 2. The fine-earth fraction is fine sandy loam or loam. The content of rock fragments is 0 to 10 percent. Reaction is extremely acid to medium acid.

The B horizon has hue of 5YR through 2.5Y, value of 3 through 6, and chroma of 2 through 6. It is sandy loam or fine sandy loam in the fine-earth fraction. The content of rock fragments ranges from 2 to 30 percent. Structure is subangular blocky or massive. Reaction is extremely acid to medium acid.

The C horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 through 4. The material is stratified, loose sand or sand and gravel. The content of rock fragments ranges from 5 to 35 percent. Reaction is very strongly acid to neutral.

The Riverhead soils in this survey area are a taxadjunct to the Riverhead series because they have a redder hue in the subsoil and a lower value and chroma in the substratum than defined for the range of the series. These differences, however, do not affect use and management of the soils.

Saprists

Saprists consist of deep, very poorly drained, organic soils that formed in black, well decomposed plant remnants. The soils are ponded with shallow water throughout much of the year. They are in low areas and depressions adjacent to open bodies of water and are in areas where beavers have dammed the water courses. Slopes range from 0 to 1 percent.

Saprists in Chenango County commonly are near Aquents, which formed in mineral soil deposits, and commonly are near slightly higher areas of Canandaigua, Alden, Atherton, and Carlisle soils.

Saprists are highly variable, and thus a typical pedon is not provided. Saprists consist of organic material more than 16 inches thick that overlies mineral soil deposits or bedrock. The bedrock is generally at a depth of more than 5 feet. Woody fragments can make up as much as 10 percent, by volume, of the lower layers. Reaction ranges from strongly acid to neutral.

The organic soil material is neutral or has hue of 10YR through 5YR, value of 2 or 3, and chroma of 0 through 2. To a depth of about 10 inches, the material is well decomposed woody or herbaceous plant remnants and is less than 15 percent rubbed fiber. Below 10 inches, some areas contain thin layers of organic material that is not so well decomposed.

The underlying mineral substratum has hue of 5YR through 10YR, value of 3 through 5, and chroma of 1 or 2. It is silty clay loam to loamy sand.

Scio series

The Scio series consists of deep, moderately well drained soils formed in water-deposited silt and very fine sand. The soils are in valleys on old alluvial terraces. Slopes range from 0 to 8 percent.

Scio soils are near somewhat poorly drained to poorly drained Raynham soils, poorly drained and very poorly drained Canandaigua soils, well drained Unadilla soils, and somewhat poorly drained Red Hook soils. Scio soils also are near well drained, gravelly Howard and Chenango soils on terraces and Hamlin and Teel soils on flood plains.

Typical pedon of Scio silt loam, 0 to 3 percent slopes, in the town of Afton, 0.4 mile south of Maple Street, and 1,000 feet east of NY Route 41:

Ap—0 to 7 inches; dark brown (10YR 3/3) silt loam; weak fine granular structure; very friable; common fine roots; very strongly acid; abrupt smooth boundary.

B21—7 to 23 inches; yellowish brown (10YR 5/6) silt loam; weak medium and coarse subangular blocky structure; very friable; few fine roots; common fine and few large pores; very strongly acid; clear wavy boundary.

B22—23 to 40 inches; dark yellowish brown (10YR 4/4) silt loam; common fine faint grayish brown (10YR 5/2) mottles, common medium distinct strong brown (7.5YR 5/6) mottles, and common fine distinct reddish brown (5YR 4/4) mottles; moderate medium and coarse subangular blocky structure; friable; few fine roots; few fine and medium pores; very strongly acid; clear wavy boundary.

C1—40 to 51 inches; brown (10YR 5/3) very fine sandy loam; many grayish brown, yellowish brown, and reddish brown varves; weak thin and medium platy structure; friable; few fine pores; very strongly acid; gradual wavy boundary.

C2—51 to 66 inches; alternating varves of reddish brown (5YR 4/3), brown (7.5YR 5/4), and grayish brown (10YR 5/2) fine sandy loam; weak thin and medium platy structure; friable; very strongly acid.

The solum thickness ranges from 20 to 40 inches, and the depth to sandy or gravelly layers is more than 40 inches. The depth to carbonates and to bedrock is more than 60 inches.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 2 or 3. Some pedons have a thin A1 horizon that has value of 2. The fine-earth fraction is silt loam or very fine sandy loam. The content of rock fragments ranges from 0 to 3 percent. Reaction is very strongly acid to medium acid.

The B horizon has hue of 7.5YR through 5Y, value of 4 or 5, and chroma of 3 through 6. The fine-earth fraction is silt loam or very fine sandy loam. Structure is

platy, prismatic, or subangular blocky. The content of rock fragments ranges from 0 to 3 percent. Reaction is very strongly acid to medium acid.

The C horizon has hue of 7.5YR through 5Y, value of 4 or 6, and chroma of 1 through 4. The fine-earth fraction is silt loam to stratified sand and gravel. Structure is platy, or the horizon is structureless. The content of rock fragments ranges from 0 to 5 percent above a depth of 40 inches and from 0 to 60 percent below 40 inches. Reaction is very strongly acid to medium acid above a depth of 40 inches and very strongly acid to mildly alkaline below 40 inches.

Teel series

The Teel series consists of deep, somewhat poorly drained and moderately well drained soils formed in stream-deposited silt on flood plains. Slopes range from 0 to 3 percent.

Teel soils and well drained Hamlin soils and poorly drained and very poorly drained Wayland soils formed in the same kind of parent material. Teel soils commonly are near well drained Unadilla soils and moderately well drained Scio soils on higher terraces.

Typical pedon of Teel silt loam, moderately well drained, in the town of Greene, 2 miles north on NY Route 12 from its intersection with Route 206, and 700 feet south of NY Route 12:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many medium roots; medium acid; abrupt smooth boundary.

B21—10 to 17 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; very friable; few medium roots; many medium pores; common old root and worm channels with dark grayish brown (10YR 4/2) fillings; slightly acid; abrupt smooth boundary.

B22—17 to 32 inches; brown (7.5YR 4/4) silt loam; many medium distinct dark grayish brown (10YR 4/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; common fine pores; medium acid; gradual wavy boundary.

B3—32 to 40 inches; dark grayish brown (10YR 4/2) silt loam; many medium distinct brown (7.5YR 4/4) mottles; weak coarse subangular blocky structure; friable; few fine roots; common fine pores; medium acid; gradual wavy boundary.

C1—40 to 60 inches; dark brown (7.5YR 4/4) silt loam; common medium distinct gray (10YR 5/1) mottles; massive; friable; few fine roots; few fine pores; medium acid; clear wavy boundary.

C2—60 to 65 inches; dark brown (7.5YR 4/4) silt loam; common medium distinct gray (10YR 5/1) and grayish brown (10YR 5/2) mottles; massive; friable; few fine pores; medium acid.

The thickness of the solum ranges from 24 to 40 inches. The depth to bedrock is more than 60 inches.

The A horizon has hue of 5YR through 10YR, value of 3 or 4, and chroma of 1 through 3. The fine-earth fraction is silt loam or very fine sandy loam. The content of rock fragments ranges from 0 to 3 percent. Reaction is strongly acid to neutral.

The B horizon has hue of 5YR through 10YR, value of 3 or 4, and chroma of 2 through 4. The fine-earth fraction is silt loam or very fine sandy loam. Structure is prismatic or subangular blocky. The content of rock fragments ranges from 0 to 3 percent. Reaction is strongly acid to neutral above a depth of 30 inches and medium acid to mildly alkaline below 30 inches.

The C horizon has hue of 5YR through 2.5Y, value of 3 through 5, and chroma of 1 through 4. The fine-earth fraction is silt loam, very fine sandy loam, or fine sandy loam. Structure is platy from fine stratification, or the horizon is massive. The content of rock fragments ranges from 0 to 20 percent. Reaction is medium acid to mildly alkaline.

Teel soils in the survey area are a taxadjunct to the Teel series because they have a lower base saturation than defined for the range of the series. This difference does not affect use and management of the soils.

Trestle series

The Trestle series consists of deep, well drained and somewhat excessively drained soils formed in glacial outwash and alluvial fill along high-gradient streams in small valleys. Slopes range from 0 to 3 percent.

Trestle soils are commonly near well drained to somewhat excessively drained Chenango soils; gravelly Castile soils; Unadilla, Scio, and Raynham soils that formed in deep deposits of silt; and alluvial deposits of Udifluvents and Fluvaquents.

Typical pedon of Trestle silt loam, in the town of Guilford, 1/4 mile west of County Route 35, and 170 feet south of Trestle Road:

Ap—0 to 10 inches; dark brown (7.5YR 4/2) silt loam; weak medium granular structure; friable; common fine roots; 10 percent coarse fragments; medium acid; clear wavy boundary.

B21—10 to 18 inches; brown (7.5YR 5/4) gravelly silt loam; weak medium subangular blocky structure; friable; common fine and few coarse roots; common fine and few coarse pores; 15 percent coarse fragments; medium acid; clear wavy boundary.

B22—18 to 23 inches; brown (7.5YR 4/4) gravelly loam; weak medium subangular blocky structure; very friable; few fine and coarse roots; common fine and few coarse pores; 25 percent coarse fragments; medium acid; clear wavy boundary.

IIC—23 to 60 inches; dark reddish brown (5YR 3/4) very gravelly coarse sandy loam; massive; loose; 60 percent coarse fragments; medium acid.

The solum thickness ranges from 15 to 30 inches. The depth to bedrock is more than 60 inches.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. The fine-earth fraction is loam to silt loam. Consistence is friable or very friable. The content of rock fragments ranges from 5 to 15 percent. Reaction is strongly acid or medium acid.

The B horizon has hue of 5YR through 10YR, value of 3 through 5, and chroma of 3 or 4. The fine-earth fraction is sandy loam to silt loam. Structure is granular or subangular blocky. Consistence is friable or very friable. The content of rock fragments ranges from 15 to 45 percent, and as much as 2 percent is larger than 3 inches in diameter. Reaction is medium acid to slightly acid.

The C horizon has hue of 5YR through 10YR, value of 3 or 4, and chroma of 3 or 4. The fine-earth fraction is coarse sandy loam to silt loam. Consistence is friable or loose. The content of rock fragments ranges from 40 to 70 percent, and as much as 5 percent is more than 3 inches in diameter. Reaction is medium acid to slightly acid.

Tuller series

The Tuller series consists of shallow, somewhat poorly drained and poorly drained soils that formed in glacial till deposits derived from siltstone, sandstone, and shale. The soils are on hilltops and benched side slopes. Slopes range from 0 to 3 percent.

Tuller soils and Arnot, Lordstown, and Greene soils formed in the same kind of parent material. The Tuller soils are not so well drained as the Arnot soils, are shallower than and not so well drained as the Lordstown soils, and are shallower than the Greene soils. Tuller soils are near deep Mardin, Volusia, Chippewa, Wellsboro, Morris, Norwich, and Alden soils.

Typical pedon of Tuller channery silt loam, in the town of Sherburne, 600 feet east of Robinson Road, and 300 feet west of Stonehouse Road:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) channery silt loam; moderate medium and fine granular structure; very friable; many fine roots; 15 percent coarse fragments; medium acid; clear smooth boundary.

B21g—8 to 11 inches; dark grayish brown (10YR 4/2) channery silt loam; common fine faint brown (10YR 5/3) mottles and few fine distinct yellowish brown (10YR 5/4) mottles; moderate medium and fine subangular blocky structure; friable; common fine and few medium roots; common fine and few medium pores; 15 percent coarse fragments; medium acid; abrupt smooth boundary.

B22g—11 to 17 inches; grayish brown (10YR 5/2) channery silt loam; common medium distinct yellowish brown (10YR 5/6 and 5/8) mottles and many medium faint gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; 15 percent coarse fragments; medium acid; abrupt smooth boundary.

IIR—17 inches; hard fine-grained sandstone.

The thickness of the solum and the depth to bedrock range from 10 to 20 inches.

The Ap horizon has hue of 7.5YR through 2.5Y, value of 3 through 5, and chroma of 2 or 3. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 15 to 35 percent. Reaction is extremely acid to medium acid.

The B horizon has hue of 5YR through 2.5Y, value of 4 through 6, and chroma of 2 or 3. There are few to many mottles. The fine-earth fraction is silt loam or loam. Structure is prismatic or subangular blocky. The content of rock fragments ranges from 15 to 35 percent. Reaction is very strongly acid to medium acid.

A thin, mottled C horizon is in some pedons.

The R horizon is hard sandstone, siltstone, or shale. In places it is interbedded.

Udifluvents

Udifluvents consist of deep, moderately well drained to somewhat excessively drained alluvial soils formed in recent stream and river deposits. The soils are along streams and rivers and are subject to frequent flooding. Slopes range from 0 to 5 percent.

Udifluvents are in a complex with more poorly drained Fluvaquents. Udifluvents commonly are near Hamlin, Teel, and Wayland soils, all of which formed in more uniform alluvial deposits, and are near Chenango and Trestle soils.

The soil characteristics of Udifluvents are highly variable, and thus a typical pedon is not provided. The soils have little or no profile development. The depth to bedrock is variable but is generally more than 60 inches.

The surface layer has hue of 2.5YR through 10YR, value of 3 through 5, and chroma of 1 through 6. It is silt loam to sand or their gravelly or very gravelly analogs. Structure is granular, or the layer is massive. The content of rock fragments ranges from 0 to 70 percent. Reaction is strongly acid to mildly alkaline. The thickness of the surface layer is variable but is generally 3 to 15 inches.

The substratum has hue of 2.5YR or 10YR, value of 3 through 5, and chroma of 3 through 6. It is mottled in some pedons. It is silt loam to sand or their gravelly or very gravelly analogs. Structure is granular, or the soil is massive. The content of rock fragments ranges from 0 to 70 percent. Reaction is strongly acid to mildly alkaline.

Udorthents

Udorthents consist of very shallow to deep, excessively drained to moderately well drained soils in areas that have been altered for construction operations or landfills. The soil material in Udorthents is derived from glacial till, glacial outwash, or alluvium. Slopes range from 0 to 30 percent.

Udorthents in the major river valleys are associated with Hamlin, Chenango, Howard, Unadilla, Scio, and Valois soils. In upland areas they are associated with Bath and Mardin soils.

Because Udorthents are so variable, a typical pedon is not provided. The soils have little or no soil profile development.

Udorthents have a surface layer that generally is 1 to 12 inches thick. In some pedons no discernible dark surface layer is present. The content of rock fragments ranges from 0 to 65 percent. Reaction is strongly acid to mildly alkaline.

The substratum has hue of 2.5YR to 2.5Y, value of 3 through 5, and chroma of 2 through 6. The texture in the upper 10 inches ranges from silt loam to gravelly sandy loam. Below 10 inches, the texture is loamy sand to silt loam or their gravelly, flaggy, stony, channery, or very channery analogs. Structure is weak, or the soil is structureless. Consistence ranges from friable to very firm. Some areas are calcareous within 30 inches of the surface. The depth to bedrock is more than 60 inches.

Unadilla series

The Unadilla series consists of deep, well drained soils on terraces in major valleys. The terraces are above the flood plain. The soils formed in wind- or water-deposited sediments high in content of coarse silt and very fine sand. Slopes range from 0 to 8 percent.

Unadilla soils commonly are near and form a drainage sequence with moderately well drained Scio soils and somewhat poorly drained and poorly drained Raynham soils. Unadilla soils also are near Arkport and Riverhead soils, which have a high sand content, and gravelly Chenango soils on terraces.

Typical pedon of Unadilla silt loam, 0 to 3 percent slopes, in the town of Greene, 1/4 mile north of the intersection of County Route 32 and Furman Road, and 660 feet west of County Route 32:

Ap—0 to 11 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; many fine roots; slightly acid; abrupt irregular boundary.

B21—11 to 22 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; very friable; common fine roots; many fine pores; old worm channels filled with material from the Ap horizon; slightly acid; clear wavy boundary.

B22—22 to 36 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few coarse and few fine pores; medium acid; gradual wavy boundary.

C1—36 to 46 inches; dark yellowish brown (10YR 4/4) very fine sandy loam; massive; friable; few fine roots; few fine pores; slightly acid; abrupt clear boundary.

IIC2—46 to 60 inches; yellowish brown (10YR 5/4) sandy loam; massive; very friable; few fine roots; 10 percent gravel; slightly acid.

The solum thickness ranges from 20 to 50 inches. The depth to bedrock is more than 60 inches, and the depth to strongly contrasting materials is more than 40 inches.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 or 3. The fine-earth fraction is very fine sandy loam or silt loam. Consistence is friable or very friable. The content of rock fragments ranges from 0 to 3 percent. Reaction in unlimed areas is very strongly acid to slightly acid.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 4 through 6. The fine-earth fraction is very fine sandy loam or silt loam. Consistence is friable or very friable. The content of rock fragments ranges from 0 to 3 percent. Reaction in unlimed areas is very strongly acid to slightly acid.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 4. The fine-earth fraction to a depth of 40 inches is very fine sandy loam or silt loam. Below 40 inches, it is silt loam or ranges from very fine sandy loam to sand. Structure is platy, or the horizon is massive. The content of rock fragments ranges from 0 to 3 percent to a depth of 40 inches and 0 to 60 percent below a depth of 40 inches. Reaction is strongly acid to mildly alkaline.

Valois series

The Valois series consists of deep, well drained soils that formed in glacial till deposits derived from siltstone, shale, and sandstone. Valois soils are in valleys and on valley sides. Slopes range from 3 to 50 percent.

Valois soils are near somewhat excessively drained to well drained Howard and Chenango soils, moderately well drained Mardin soils, and somewhat poorly drained Volusia soils. Valois soils are near Bath soils but do not have the very firm layer in the subsoil that is typical of the Bath soils.

Typical pedon of Valois gravelly silt loam, 3 to 8 percent slopes, in the town of Pitcher, 1,000 feet northeast of Pink Hill Road, and 150 feet south of Holen Road:

Ap—0 to 9 inches; dark brown (10YR 4/3) gravelly silt loam; weak fine granular structure; friable; many fine and few medium roots; 15 percent coarse fragments; medium acid; gradual wavy boundary.

A2—9 to 14 inches; grayish brown (10YR 5/2) gravelly silt loam; moderate medium and fine granular structure; friable; many fine and few medium roots; 20 percent coarse fragments; medium acid; clear wavy boundary.

B21—14 to 22 inches; yellowish brown (10YR 5/6) gravelly silt loam; weak fine subangular blocky structure; friable; common fine roots; 25 percent coarse fragments; medium acid; clear wavy boundary.

B22—22 to 40 inches; yellowish brown (10YR 5/6) gravelly silt loam; moderate medium subangular blocky structure; friable; few fine roots; 30 percent coarse fragments, 5 percent larger than 3 inches in diameter; medium acid; clear wavy boundary.

C—40 to 60 inches; dark yellowish brown (10YR 4/4) crudely stratified very gravelly sandy loam; massive; friable; 45 percent coarse fragments, 10 percent larger than 3 inches in diameter; medium acid.

The thickness of the solum ranges from 30 to 70 inches. The depth to bedrock is more than 60 inches. The depth to layers that are 35 to 70 percent rock fragments is more than 40 inches.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Some pedons have an A1 horizon that has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The fine earth fraction is fine sandy loam to silt loam. The content of rock fragments ranges from 15 to 35 percent. Reaction is very strongly acid to medium acid.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 or 5, and chroma of 3 through 6. The fine-earth fraction is fine sandy loam or silt loam. The content of rock fragments ranges from 5 to 35 percent above a depth of 20 inches and from 20 to 35 percent between depths of 20 and 40 inches. Reaction is very strongly acid to medium acid above a depth of 30 inches and medium acid to neutral below 30 inches.

The C horizon has hue of 7.5YR through 2.5Y, value of 3 through 6, and chroma of 2 through 4. The fine-earth fraction is sandy loam to loam. The content of rock fragments ranges from 35 to 70 percent. Reaction is medium acid to neutral.

Volusia series

The Volusia series consists of deep, somewhat poorly drained soils formed in glacial till deposits derived from siltstone, sandstone, and shale. Volusia soils are on hilltops and side slopes on the uplands. Slopes range from 0 to 15 percent.

Volusia soils form a drainage sequence with well drained Bath soils, moderately well drained Mardin soils, and poorly drained and very poorly drained Chippewa soils. Volusia soils are near Wellsboro, Lackawanna, Morris, and Norwich soils but are not so red as those soils.

Typical pedon of Volusia channery silt loam, 3 to 8 percent slopes, in the town of New Berlin, 1 mile northeast of King Settlement Road, and 160 feet east of Dilly Hill Road:

Ap—0 to 10 inches; dark brown (10YR 4/3) channery silt loam; moderate medium granular structure; friable; many fine roots; 20 percent coarse fragments; medium acid; abrupt smooth boundary.

A2—10 to 15 inches; grayish brown (2.5Y 5/2) channery silt loam; many medium distinct strong brown (7.5YR 5/6) mottles; weak subangular blocky structure; friable; common fine roots; many fine pores; 20 percent coarse fragments; medium acid; clear wavy boundary.

Bx1—15 to 31 inches; brown (10YR 5/3) channery silt loam; few fine faint grayish brown (10YR 5/2) mottles; moderate very coarse prismatic structure; very firm and brittle; few fine roots between prisms; few fine pores; 25 percent coarse fragments; prisms are separated approximately every 24 to 48 inches by wedges of gray (10YR 5/1) silt, up to 1.5 inches wide, that have a yellowish brown (10YR 5/4) exterior; medium acid; gradual wavy boundary.

Bx2—31 to 48 inches; grayish brown (10YR 5/2) channery loam; few fine faint brown (10YR 5/3) mottles; moderate very coarse prismatic structure; very firm and brittle; common fine pores with thin clay linings; 30 percent coarse fragments; medium acid; gradual wavy boundary.

C—48 to 60 inches; grayish brown (2.5Y 5/2) very channery silt loam; massive; firm; few fine pores with few thin linings; 40 percent coarse fragments, some stone and flagstones; slightly acid.

The thickness of the solum ranges from 40 to 72 inches. The depth to the fragipan ranges from 10 to 20 inches. Bedrock is at a depth of more than 60 inches.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 2 or 3. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 15 to 30 percent. Reaction is very strongly acid to slightly acid.

The A2 horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 or 3. There are common or many, distinct to prominent mottles. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 10 to 35 percent. Structure is platy or blocky, or the soil is massive. Reaction is very strongly acid to slightly acid.

The Bx horizon has hue of 10YR through 5Y, value of 3 through 5, and chroma of 2 through 4. There are few or common, faint to distinct mottles. The fine-earth fraction is loam, silt loam, clay loam, or silty clay loam. The content of rock fragments ranges from 10 to 35 percent. Reaction is strongly acid to neutral.

The C horizon has hue of 10YR through 5Y, value of 3 through 5, and chroma of 2 through 4. The fine-earth fraction is loam or silt loam. The content of rock frag-

ments ranges from 10 to 50 percent. Structure is platy, or the horizon is massive. Reaction is medium acid to moderately alkaline.

Wayland series

The Wayland series consists of deep, poorly drained and very poorly drained soils formed in recently deposited sediments along streams and drainageways. Slopes range from 0 to 3 percent.

Wayland soils form a drainage sequence with well drained Hamlin soils and moderately well drained and somewhat poorly drained Teel soils. Wayland soils are near frequently flooded Udifluvents and Fluvaquents and are near well drained Unadilla soils and moderately well drained Scio soils on adjacent higher terraces.

Typical pedon of Wayland silt loam, in the town of Norwich, 1/4 mile west of East River Road, and 100 feet south of Hale Street:

Ap—0 to 9 inches; dark gray (10YR 4/1) silt loam; moderate medium and coarse granular structure; friable; common roots; strongly acid; clear smooth boundary.

B2g—9 to 21 inches; grayish brown (10YR 5/2) silt loam; common fine and medium distinct dark brown (7.5YR 4/4) and strong brown (7.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; common fine roots; common fine pores; medium acid; gradual wavy boundary.

C1g—21 to 28 inches; gray (5Y 5/1) silt loam; common fine distinct dark yellowish brown mottles; massive; friable; common fine roots and pores; medium acid; abrupt wavy boundary.

C2g—28 to 47 inches; grayish brown (2.5Y 5/2) silt loam; many medium distinct dark brown (7.5YR 4/4) mottles; massive; friable; few roots; common pores lined with silt; medium acid; gradual diffuse boundary.

C3g—47 to 54 inches; gray (N 6/0) silt loam; many medium distinct strong brown (7.5YR 5/6 and 5/8) mottles; massive; friable; few roots; common pores; medium acid; clear wavy boundary.

C4g—54 to 60 inches; gray (N 5/0) silt loam; massive; friable; medium acid.

The depth to stratified deposits is more than 40 inches. Bedrock and carbonates are at a depth of more than 60 inches.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 or 2. The fine-earth fraction is silt loam or silty clay loam. The content of rock fragments ranges from 0 to 3 percent. Reaction is strongly acid to neutral.

The B horizon is neutral or has hue of 7.5YR through 5Y, value of 3 through 6, and chroma of 0 through 2. The fine-earth fraction is silt loam or silty clay loam. Structure is subangular blocky or prismatic. The content of rock fragments ranges from 0 to 3 percent. Reaction mainly is strongly acid to neutral. In some pedons part of the B horizon is below a depth of 24 inches and is medium acid to neutral.

The C horizon is neutral or has hue of 7.5YR through 5Y, value of 3 through 6, and chroma of 0 through 2. The fine-earth fraction is silty clay loam to fine sandy loam. Structure is platy, or the horizon is massive. The content of rock fragments ranges from 0 to 5 percent above a depth of 36 inches and from 0 to 30 percent below 30 inches. Reaction is medium acid to neutral.

The Wayland soils in this survey area are a taxadjunct to the Wayland series because they have a higher color value in the surface layer than defined for the series and they have free carbonates below a depth of 60 inches. These differences do not affect use and management of the soils.

Wellsboro series

The Wellsboro series consists of deep, moderately well drained soils formed in glacial till deposits derived from siltstone, sandstone, and shale. Wellsboro soils are on hilltops and hillsides on uplands. Slopes range from 3 to 15 percent.

Wellsboro soils are near and form a drainage sequence with well drained Lackawanna soils, somewhat poorly drained Morris soils, and poorly drained and very poorly drained Norwich soils. Wellsboro soils also are near but do not have the brown color of Bath, Mardin, Volusia, and Chippewa soils.

Typical pedon of Wellsboro channery silt loam, 3 to 8 percent slopes, in the town of Norwich, 1,300 feet west of Wells Road, and 260 feet south of N.Y. Route 23:

Ap—0 to 8 inches; dark brown (10YR 3/3) channery silt loam; weak medium and fine subangular blocky structure; friable; many fine and common medium roots; 25 percent coarse fragments; strongly acid; clear smooth boundary.

B21—8 to 14 inches; reddish brown (5YR 4/4) channery silt loam; moderate medium and fine subangular blocky structure; friable; common fine roots; common fine and medium pores; 20 percent coarse fragments; strongly acid; clear smooth boundary.

B22—14 to 18 inches; reddish brown (5YR 4/3) channery silt loam; common medium faint reddish gray (5YR 5/2) and pinkish gray (5YR 6/2) mottles and few medium faint yellowish red (5YR 5/6) mottles; moderate medium and fine subangular blocky structure; friable; common fine roots and pores; 15 percent coarse fragments; reddish brown (5YR 5/3) ped faces; strongly acid; clear smooth boundary.

Bx—18 to 58 inches; reddish brown (2.5YR 4/4) channery silt loam; moderate very coarse prismatic structure; separated by gray (5YR 6/1) and light gray (5YR 7/1) wedges with yellowish red (5YR 5/8)

edges; firm and brittle; few roots along prism faces and common fine and medium pores; 25 percent coarse fragments; weak red (2.5YR 5/2) ped faces; strongly acid; gradual wavy boundary.

C—58 to 66 inches; reddish brown (5YR 4/3) channery silt loam; massive; firm; common fine pores, some with clay linings; 30 percent coarse fragments; strongly acid.

The thickness of the solum ranges from 40 to 75 inches. The depth to the fragipan is 15 to 26 inches. Bedrock is at a depth of 60 inches or more.

The Ap horizon has hue of 10YR through 5YR, value of 3 or 4, and chroma of 2 or 3. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 15 to 35 percent. Reaction is very strongly acid to medium acid.

The B2 horizon has hue of 2.5YR through 10YR, value of 4 or 5, and chroma of 3 through 6. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 3 to 35 percent. Reaction is very strongly acid to medium acid.

The Bx horizon has hue of 10R through 5YR, value of 3 through 5, and chroma of 2 through 4. The fine-earth fraction is loam or silt loam. Structure mainly is prismatic, and in some pedons it parts to platy or blocky. The content of rock fragments ranges from 5 to 50 percent. Reaction is very strongly acid to medium acid.

The C horizon has hue of 10R through 5YR, value of 4 or 5, and chroma of 3 through 6. The fine-earth fraction is loam or silt loam. The content of rock fragments ranges from 15 to 50 percent. Reaction is very strongly acid to medium acid.

Formation of the Soils

This section describes the factors of soil formation and explains the processes of soil horizon development as they relate to soils in Chenango County.

Factors of Soil Formation

Soil is formed through the interaction of five major factors: parent material, climate, plant and animal life, relief, and time. The relative influence of each factor generally varies from place to place. Local variations are caused mainly by parent material, relief, and drainage. In places one or two factors dominate and determine most of the properties of the soil.

Parent Material

Parent material is the unconsolidated earthy mass from which soils are formed. It determines the mineralogical composition of the soil, contributes greatly to the chemical composition of the soil, and to a large extent influences the rate at which soil-forming processes take place and the color of the soil. Table 20 shows the relationship between soil series and the different types of parent material, landscape positions, and drainage.

Most of the soils in Chenango County formed in different types of deposits resulting from glaciation. Glacial till is the most extensive source of parent material. Another less extensive parent material in the county is glaciofluvial (outwash) deposits. Some soils formed in more recent deposits of stream alluvium and in the accumulation of organic material.

The soils that formed in deep glacial till, such as Bath, Mardin, Volusia, and Chippewa soils, commonly have a fragipan and a firm substratum. In some soils, for example, the Lordstown and Arnot soils, the glacial till mantle is moderately deep or shallow over bedrock.

During the retreat of glacial ice, enormous quantities of meltwater carried and sorted soil and rock debris. This outwash material was redeposited in layers of sand and gravel to form outwash terraces, kames, eskers, and deltas. Examples of soils that formed in outwash deposits are Chenango and Howard soils.

In more recent times, floodwaters from streams have deposited alluvial material along valley bottoms. Soils formed in this material generally are loamy and show little soil development. Unadilla, Scio, Raynham, and Canandaigua soils on terraces have formed in older alluvial deposits. Hamlin, Teel and Wayland soils have formed in more recent flood-plain deposits. Carlisle soils are an example of soils that formed in organic material.

Climate

Climate, particularly temperature and precipitation, determines to a large degree the amount of weathering the soils undergo, the growth and kind of vegetation, and the leaching and translocation of weathered materials.

Chenango County has a humid temperate climate which tends to promote the development of moderately weathered, leached soils. Although there is some variation in winter precipitation and temperature between the northern and southern regions of the county, the variability of climate is not great enough to cause major differences among the soils in the county. For more detailed information on climate, see the section "General Nature of the Survey Area."

Plant and Animal Life

Chenango County has large areas of hardwoods and conifers. The loss of nutrients through leaching is retarded by hardwoods that take up the nutrients and return them to the surface each year as leaf litter. Conifers do not use large amounts of nutrients; therefore, leaching is not retarded as it is under hardwoods. Plants also contribute to organic matter in the surface layer and affect the color and structure of the soil.

Earthworms and large burrowing animals make the soil more permeable to air and water. Their waste products cause aggregations of the soil particles and improve soil structure. The formation of organic acid by the action of bacteria and fungi on leaf litter helps in the weathering of soil minerals. Soil microbial life decomposes the organic waste products returned to the soil.

The activities of man have brought about significant changes in many of the soils in the county. Clearing and tillage have accelerated erosion. Artificial drainage has made many wet soils suitable for crops. In the surface layer of many cultivated fields, the organic matter content has been lowered, and in places the surface layer has been mixed with the subsoil through plowing. The microbiologic activity in the soil is often changed by continued use of lime, fertilizer, and pesticides.

Relief

The shape of the land surface, the slope, and the position of the land surface in relation to the water table have influenced the formation of soils in the county. Soils that formed on convex, sloping areas that accumulate little runoff or where the rate of runoff is moderate to rapid generally are well drained and have a uniformly brownish subsoil. These soils generally are leached to a greater depth than the low lying, wetter soils in the same general area. In less sloping areas, where runoff is slower, the soils generally exhibit some evidence of wetness, such as mottling in the subsoil. In level areas or in slight depressions where the water table is at or near the surface for long periods, the soils show evidence of wetness to a marked degree. They have a dark surface layer and a very strongly mottled or grayish subsoil.

Time

In geological terms, the deposits in which the soils in Chenango County formed are relatively young. Most of the parent material was left after the last glacier retreated 10,000 to 15,000 years ago. All the soils, however, have not reached the same stage of profile development, or maturity, because the degree of profile development reflects not only the age of a soil but also the influence of other factors. Lansing soils, for example, appear to be younger than Bath and Chenango soils, but this is caused by a difference in parent material. All of the soils have well-defined horizons.

An immature soil has not had enough time for distinct horizons to form. Teel and Hamlin soils, for example, are forming in alluvial sediments on flood plains. They are immature because of the periodic deposition of fresh alluvium and have weak horizon development.

Processes of Soil Horizon Development

In Chenango County the processes involved in the formation of soil horizons include the accumulation of organic matter, the leaching of soluble salts and minerals, the translocation of silicate clay minerals, the reduction and transfer of iron, and the formation of dense or compact layers in the subsoil.

The accumulation of organic matter is a slow process that takes place as plant residue decomposes. This process darkens the surface layer and helps form the A1 horizon. The surface layer of the soils in Chenango County is about 2 to 4 percent organic matter.

For soils to develop a distinct subsoil, some of the lime and other soluble salts must be leached before other soil processes, such as translocation of clay minerals, can take place. Many factors affect leaching, including the kinds of salts originally present, the rate and depth of percolation, and the texture of the soil.

The amount of clay minerals in a soil is inherent in the parent material, but clay content varies from one soil horizon to another. Translocation of silicate clay minerals involves the eluviation of clay particles downward from the A horizon and their redeposition in the B horizon as clay films on ped faces, as linings along pores and root channels, and as coatings on some coarse fragments. In some soils an A2 horizon has formed by the considerable eluviation of clay minerals to the B horizon. The Howard soils are an example of soils that, because of translocation, have a higher clay content in the B horizon than in the A horizon.

The reduction and transfer of iron compounds occurs mainly in the wetter, more poorly drained soils. This process is known as gleying. In the poorly drained to very poorly drained soils, such as the Chippewa and Norwich soils, the grayish subsoil and underlying material indicate reduction and the removal and transfer of iron in solution. In the moderately well drained or somewhat poorly drained soils, yellowish brown and reddish brown mottles indicate the segregation of iron compounds. Oxidation, along with some reduction, has taken place in these soils.

Many of the soils in Chenango County have developed a distinct fragipan, or very dense layer, in the subsoil. The fragipan is very firm and brittle when moist and is very hard when dry. Studies indicate that shrinking and swelling take place in alternating wet and dry periods, which may account for the dense packing of soil particles, the low pore space, and the gross polygonal pattern of vertical cracks in most fragipans. Clay, silica, and oxides of aluminum are the most likely cementing agents causing brittleness and hardness. The Bath, Mardin, and Volusia soils are examples of soils in the county that have a well expressed fragipan.

Several well drained and moderately well drained soils in the county have a strong brown, yellowish brown, or reddish brown subsoil. These colors are mainly caused by thin coatings of iron oxides on sand and silt particles. In the Lackawanna soils, however, the color is inherent from the reddish parent material in which the soil has developed. A bright-colored subsoil with iron oxide coatings generally has subangular blocky structure and little or no clay translocation from the overlying surface layer.

References

(1) American Association of State Highway [and Transportation] Officials. 1970. Standard specifications for highway materials and methods of sampling and testing. Ed. 10, 2 vol., illus.

(2) American Society for Testing and Materials. 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 2487-69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.

(3) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. [Supplements replacing pp. 173-188 issued May 1962.]

(4) United States Department of Agriculture, 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(5) United States Department of Agriculture. 1982. Forest statistics for New York—1980. Forest Serv. Resour. Bull. NE-71. 118 pp.

(6) United States Department of Commerce, Bureau of the Census. 1976. Census of agriculture, Chenango County, New York. Vol. 1, part 32. pp. 229-234.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as—

	Inches
Very low	<2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	>5.2

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A system that retains protective amounts of residue mulch on the surface throughout the year. It includes no-tillage, strip tillage, stubble mulching, and other types of noninversion tillage.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough

during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian. Earthy material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial melt water. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Kettle (geology). A depression in the ground surface formed by the melting of an ice block buried in glacial drift.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial melt water.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called groundwater runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series be-

cause they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by melt water streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber. Page start for tables -- 115

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data were recorded in the period 1951-79 at Norwich, New York]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	30.0	9.0	19.5	55	-20	7	2.74	1.74	3.63	8	16.4
February---	31.9	9.6	20.8	56	-20	6	2.47	1.46	3.36	7	15.1
March------	41.1	20.3	30.7	71	-5	29	3.21	2.00	4.30	8	11.9
April------	55.8	31.5	43.3	84	13	159	3.47	2.42	4.44	9	3.4
May--------	66.7	40.4	53.6	88	22	422	3.64	2.37	4.80	9	.3
June-------	75.8	49.9	62.9	91	32	687	4.04	2.54	5.38	8	.0
July-------	80.4	54.1	67.3	93	39	846	3.70	2.39	4.87	8	.0
August-----	78.8	52.2	65.5	92	36	791	3.19	2.00	4.25	8	.0
September--	71.5	45.2	58.4	90	26	552	3.80	2.24	5.19	8	.0
October----	60.6	35.1	47.9	82	16	263	3.14	1.38	4.64	7	.6
November---	47.1	27.8	37.5	70	6	57	3.70	2.13	5.09	8	5.3
December---	34.5	16.4	25.5	60	-13	13	3.48	2.12	4.69	10	17.3
Yearly:											
Average--	56.1	32.6	44.4	---	---	---	---	---	---	---	---
Extreme--	---	---	---	94	-24	---	---	---	---	---	---
Total----	---	---	---	---	---	3,832	40.58	36.42	44.63	98	70.3

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data were recorded in the period 1951-79 at Norwich, New York]

Probability	Temperature: 24° F or lower	Temperature: 28° F or lower	Temperature: 32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 16	May 23	June 6
2 years in 10 later than--	May 10	May 19	June 2
5 years in 10 later than--	April 29	May 11	May 25
First freezing temperature in fall:			
1 year in 10 earlier than--	September 28	September 19	September 7
2 years in 10 earlier than--	October 4	September 25	September 12
5 years in 10 earlier than--	October 16	October 7	September 22

TABLE 3.--GROWING SEASON

[Data were recorded in the period 1951-79 at Norwich, New York]

Probability	Daily minimum temperature during growing season: Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	143	126	97
8 years in 10	152	134	105
5 years in 10	170	148	120
2 years in 10	187	163	135
1 year in 10	196	171	143

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ad	Alden silt loam	1,984	0.3
ArB	Arkport fine sandy loam, 3 to 8 percent slopes	326	0.1
AsB	Arnot channery silt loam, 3 to 8 percent slopes	2,970	0.5
AsC	Arnot channery silt loam, 8 to 15 percent slopes	452	0.1
At	Atherton silt loam	2,023	0.3
BaB	Bath channery silt loam, 3 to 8 percent slopes	4,033	0.7
BaC	Bath channery silt loam, 8 to 15 percent slopes	5,260	0.9
BaD	Bath channery silt loam, 15 to 25 percent slopes	6,039	1.0
BvB	Bath-Valois gravelly silt loams, undulating	2,929	0.5
BvC	Bath-Valois gravelly silt loams, rolling	4,873	0.8
BvD	Bath-Valois gravelly silt loams, hilly	12,728	2.2
Ca	Canandaigua silt loam	1,099	0.2
CbB	Canaseraga silt loam, 3 to 8 percent slopes	264	0.1
CbC	Canaseraga silt loam, 8 to 15 percent slopes	240	*
Cc	Carlisle muck	1,512	0.3
CdA	Castile gravelly silt loam, 0 to 3 percent slopes	778	0.1
CdB	Castile gravelly silt loam, 3 to 8 percent slopes	752	0.1
ChA	Chenango gravelly silt loam, 0 to 3 percent slopes	1,605	0.3
ChB	Chenango gravelly silt loam, 3 to 8 percent slopes	5,842	1.0
ChC	Chenango gravelly silt loam, 8 to 15 percent slopes	3,571	0.6
ChD	Chenango gravelly silt loam, 15 to 25 percent slopes	2,554	0.4
ChE	Chenango gravelly silt loam, 25 to 35 percent slopes	1,859	0.3
CkA	Chenango channery silt loam, fan, 0 to 3 percent slopes	4,873	0.8
CkB	Chenango channery silt loam, fan, 3 to 8 percent slopes	4,577	0.8
Cm	Chippewa and Norwich soils	12,066	2.0
Cn	Chippewa and Norwich very stony silt loams	6,566	1.2
GrB	Greene silt loam, 3 to 8 percent slopes	5,069	0.9
GrC	Greene silt loam, 8 to 15 percent slopes	1,010	0.2
Ha	Hamlin silt loam, low bottom	4,592	0.8
Hb	Hamlin silt loam, high bottom	977	0.2
HoA	Howard gravelly loam, 0 to 3 percent slopes	1,621	0.3
HoB	Howard gravelly loam, 3 to 8 percent slopes	4,232	0.7
HoC	Howard gravelly loam, 8 to 15 percent slopes	1,852	0.3
HoD	Howard gravelly loam, 15 to 25 percent slopes	1,524	0.3
HoE	Howard gravelly loam, 25 to 35 percent slopes	1,062	0.2
HpA	Howard silt loam, 0 to 3 percent slopes	538	0.1
HpB	Howard silt loam, 3 to 8 percent slopes	933	0.2
HpC	Howard silt loam, 8 to 15 percent slopes	674	0.1
LaB	Lackawanna channery silt loam, 3 to 8 percent slopes	2,563	0.4
LaC	Lackawanna channery silt loam, 8 to 15 percent slopes	4,833	0.8
LaD	Lackawanna channery silt loam, 15 to 25 percent slopes	2,710	0.5
LaE	Lackawanna channery silt loam, 25 to 35 percent slopes	483	0.1
LnB	Lansing gravelly silt loam, 3 to 8 percent slopes	535	0.1
LnC	Lansing gravelly silt loam, 8 to 15 percent slopes	868	0.1
LnD	Lansing gravelly silt loam, 15 to 25 percent slopes	147	*
LoB	Lordstown channery silt loam, 3 to 8 percent slopes	33,559	5.8
LoC	Lordstown channery silt loam, 8 to 15 percent slopes	35,603	6.1
LrE	Lordstown and Oquaga channery silt loams, 15 to 35 percent slopes	40,938	7.1
LrF	Lordstown and Oquaga channery silt loams, 35 to 50 percent slopes	6,725	1.2
MaB	Mardin channery silt loam, 3 to 8 percent slopes	48,813	8.4
MaC	Mardin channery silt loam, 8 to 15 percent slopes	52,864	9.1
MaD	Mardin channery silt loam, 15 to 25 percent slopes	16,211	2.8
MbE	Mardin and Lackawanna very stony silt loams, 15 to 35 percent slopes	4,889	0.8
McB	Mardin and Wellsboro very stony silt loams, 3 to 8 percent slopes	6,686	1.2
McC	Mardin and Wellsboro very stony silt loams, 8 to 15 percent slopes	8,373	1.4
MoA	Morris channery silt loam, 0 to 3 percent slopes	552	0.1
MoB	Morris channery silt loam, 3 to 8 percent slopes	6,318	1.1
MoC	Morris channery silt loam, 8 to 15 percent slopes	2,334	0.4
OaB	Oquaga channery silt loam, 3 to 8 percent slopes	3,236	0.6
OaC	Oquaga channery silt loam, 8 to 15 percent slopes	3,115	0.5
OlB	Oquaga and Lordstown very stony silt loams, 3 to 8 percent slopes	1,805	0.3
OlC	Oquaga and Lordstown very stony silt loams, 8 to 15 percent slopes	2,990	0.5
OlE	Oquaga and Lordstown very stony silt loams, 15 to 35 percent slopes	6,273	1.1
PhA	Phelps gravelly silt loam, 0 to 3 percent slopes	220	*
PhB	Phelps gravelly silt loam, 3 to 8 percent slopes	543	0.1
Pt	Pits, gravel and sand	509	0.1
Pu	Pits, quarry	281	0.1
Ra	Raynham silt loam	1,211	0.2
Re	Red Hook silt loam	884	0.2
RhB	Riverhead fine sandy loam, 3 to 8 percent slopes	309	0.1

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
RhC	Riverhead fine sandy loam, 8 to 15 percent slopes	220	*
Sa	Saprists and Aquents, ponded	555	0.1
ScA	Scio silt loam, 0 to 3 percent slopes	1,621	0.3
ScB	Scio silt loam, 3 to 8 percent slopes	577	0.1
Te	Teel silt loam, moderately well drained	4,395	0.8
Th	Teel silt loam, somewhat poorly drained	1,785	0.3
Tr	Trestle silt loam	2,818	0.5
Tu	Tuller channery silt loam	1,756	0.3
Ud	Udifluvents-Fluvaquents complex, frequently flooded	10,168	1.7
Ue	Udorthents, smoothed	715	0.1
UnA	Unadilla silt loam, 0 to 3 percent slopes	461	0.1
UnB	Unadilla silt loam, 3 to 8 percent slopes	615	0.1
VaB	Valois gravelly silt loam, 3 to 8 percent slopes	5,803	1.0
VaC	Valois gravelly silt loam, 8 to 15 percent slopes	6,104	1.1
VaD	Valois gravelly silt loam, 15 to 25 percent slopes	3,838	0.7
VaE	Valois gravelly silt loam, 25 to 35 percent slopes	1,999	0.3
VaF	Valois gravelly silt loam, 35 to 50 percent slopes	2,590	0.4
VoA	Volusia channery silt loam, 0 to 3 percent slopes	5,292	0.9
VoB	Volusia channery silt loam, 3 to 8 percent slopes	50,756	8.8
VoC	Volusia channery silt loam, 8 to 15 percent slopes	22,325	3.8
VpB	Volusia and Morris very stony silt loams, 3 to 10 percent slopes	22,776	3.9
Wa	Wayland silt loam	4,542	0.8
WeB	Wellsboro channery silt loam, 3 to 8 percent slopes	7,168	1.2
WeC	Wellsboro channery silt loam, 8 to 15 percent slopes	6,507	1.1
	Water	2,495	0.4
	Total	581,120	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

[Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name]

Map symbol	Soil name
ArB	Arkport fine sandy loam, 3 to 8 percent slopes
BaB	Bath channery silt loam, 3 to 8 percent slopes
BvB	Bath-Valois gravelly silt loams, undulating
CdA	Castile gravelly silt loam, 0 to 3 percent slopes
CdB	Castile gravelly silt loam, 3 to 8 percent slopes
ChA	Chenango gravelly silt loam, 0 to 3 percent slopes
ChB	Chenango gravelly silt loam, 3 to 8 percent slopes
CkA	Chenango channery silt loam, fan, 0 to 3 percent slopes
CkB	Chenango channery silt loam, fan, 3 to 8 percent slopes
Ha	Hamlin silt loam, low bottom
Hb	Hamlin silt loam, high bottom
HoA	Howard gravelly loam, 0 to 3 percent slopes
HoB	Howard gravelly loam, 3 to 8 percent slopes
HpA	Howard silt loam, 0 to 3 percent slopes
HpB	Howard silt loam, 3 to 8 percent slopes
LaB	Lackawanna channery silt loam, 3 to 8 percent slopes
LnB	Lansing gravelly silt loam, 3 to 8 percent slopes
LoB	Lordstown channery silt loam, 3 to 8 percent slopes
PhA	Phelps gravelly silt loam, 0 to 3 percent slopes
PhB	Phelps gravelly silt loam, 3 to 8 percent slopes
Ra	Raynham silt loam (where drained)
Re	Red Hook silt loam (where drained)
RhB	Riverhead fine sandy loam, 3 to 8 percent slopes
ScA	Scio silt loam, 0 to 3 percent slopes
Te	Teel silt loam, moderately well drained
Th	Teel silt loam, somewhat poorly drained (where drained)
Tr	Trestle silt loam
UnA	Unadilla silt loam, 0 to 3 percent slopes
VaB	Valois gravelly silt loam, 3 to 8 percent slopes
WeB	Wellsboro channery silt loam, 3 to 8 percent slopes

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield figure indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Land capability	Corn silage	Corn	Alfalfa hay	Grass-legume hay	Oats	Winter wheat	Pasture
		Tons	Bu	Tons	Tons	Bu	Bu	AUM*
Ad------------- Alden	IVw	12	60	---	2.5	---	---	5.0
ArB------------- Arkport	IIe	22	110	5.0	4.0	80	55	6.5
AsB------------- Arnot	IIIe	14	70	2.5	2.0	50	35	3.5
AsC------------- Arnot	IVe	10	50	2.0	1.5	40	30	2.5
At------------- Atherton	IVw	12	60	---	3.0	40	---	5.5
BaB------------- Bath	IIe	20	100	4.0	4.0	80	45	7.5
BaC------------- Bath	IIIe	19	95	3.5	3.5	75	45	6.5
BaD------------- Bath	IVe	16	80	3.5	3.5	65	40	6.5
BvB------------- Bath-Valois	IIe	20	100	4.0	4.0	80	45	7.5
BvC------------- Bath-Valois	IIIe	19	95	3.5	3.5	75	45	6.5
BvD------------- Bath-Valois	IVe	16	80	3.5	3.0	65	40	6.0
Ca------------- Canandaigua	IVw	12	60	---	3.0	---	---	5.0
CbB------------- Canaseraga	IIe	18	90	3.5	3.0	70	40	6.0
CbC------------- Canaseraga	IIIe	17	85	3.0	3.0	65	40	5.0
Cc------------- Carlisle	Vw	---	---	---	---	---	---	---
CdA------------- Castile	IIw	21	105	4.0	4.5	85	55	8.5
CdB------------- Castile	IIw	21	105	4.0	4.5	85	55	8.5
ChA------------- Chenango	IIs	21	105	4.5	3.5	90	55	6.5
ChB------------- Chenango	IIs	21	105	4.5	3.5	90	55	6.5
ChC------------- Chenango	IIIe	17	90	4.0	3.0	80	50	6.0
ChD------------- Chenango	IVe	16	80	4.0	3.0	65	45	6.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn silage	Corn	Alfalfa hay	Grass-legume hay	Oats	Winter wheat	Pasture
		Tons	Bu	Tons	Tons	Bu	Bu	AUM*
ChE------------- Chenango	VIe	---	---	---	---	---	---	---
CkA------------- Chenango	IIs	18	90	5.0	4.0	80	45	7.5
CkB------------- Chenango	IIs	18	90	5.0	4.0	80	45	7.5
Cm-------------- Chippewa and Norwich	IVw	---	---	---	2.5	---	---	5.0
Cn-------------- Chippewa and Norwich	VIIs	---	---	---	---	---	---	2.5
GrB------------- Greene	IIIw	13	65	---	3.0	40	---	6.0
GrC------------- Greene	IIIe	10	50	---	3.0	40	---	6.0
Ha, Hb---------- Hamlin	I	26	130	5.5	4.5	80	70	8.5
HoA, HoB-------- Howard	IIs	22	110	5.0	4.0	95	60	7.5
HoC------------- Howard	IIIe	17	90	4.5	3.5	85	60	6.5
HoD------------- Howard	IVe	16	80	4.0	3.0	65	55	6.0
HoE------------- Howard	VIe	---	---	---	---	---	---	---
HpA------------- Howard	I	23	115	5.0	4.0	95	60	7.5
HpB------------- Howard	IIe	22	110	5.0	4.0	95	60	7.5
HpC------------- Howard	IIIe	18	90	4.5	3.5	85	55	6.5
LaB------------- Lackawanna	IIe	20	100	4.0	4.0	80	45	7.5
LaC------------- Lackawanna	IIIe	19	95	3.5	3.5	75	45	6.5
LaD------------- Lackawanna	IVe	16	80	3.5	3.5	65	40	6.5
LaE------------- Lackawanna	VIe	---	---	---	---	---	---	---
LnB------------- Lansing	IIe	24	120	5.0	4.5	95	65	8.5
LnC------------- Lansing	IIIe	22	110	4.5	4.0	85	60	7.5
LnD------------- Lansing	IVe	18	90	4.0	3.5	75	55	6.5

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn silage	Corn	Alfalfa hay	Grass-legume hay	Oats	Winter wheat	Pasture
		Tons	Bu	Tons	Tons	Bu	Bu	AUM*
LoB------------- Lordstown	IIe	19	95	3.5	3.0	75	45	6.0
LoC------------- Lordstown	IIIe	17	85	3.0	3.0	70	40	6.0
LrE------------- Lordstown and Oquaga	VIe	---	---	---	---	---	---	---
LrF------------- Lordstown and Oquaga	VIIe	---	---	---	---	---	---	---
MaB------------- Mardin	IIw	19	95	3.5	4.0	70	40	7.5
MaC------------- Mardin	IIIe	17	85	3.0	3.5	65	40	6.5
MaD------------- Mardin	IVe	14	70	3.0	3.5	65	35	6.5
MbE------------- Mardin and Lackawanna	VIIs	---	---	---	---	---	---	---
McB, McC-------- Mardin and Wellsboro	VIs	---	---	---	---	---	---	3.0
MoA, MoB-------- Morris	IIIw	16	85	3.0	3.5	50	35	6.5
MoC------------- Morris	IIIe	14	70	2.5	3.0	40	30	6.0
OaB------------- Oquaga	IIe	19	95	3.5	3.0	75	45	6.0
OaC------------- Oquaga	IIIe	17	85	3.0	3.0	70	40	6.0
OlB, OlC-------- Oquaga and Lordstown	VIs	---	---	---	---	---	---	3.0
OlE------------- Oquaga and Lordstown	VIIs	---	---	---	---	---	---	---
PhA------------- Phelps	IIw	22	110	4.0	4.5	90	55	8.5
PhB------------- Phelps	IIe	22	110	4.0	4.5	90	50	8.5
Pt**, Pu**. Pits								
Ra-------------- Raynham	IIIw	19	95	3.5	4.0	60	---	7.5
Re-------------- Red Hook	IIIw	18	90	3.5	3.5	60	---	6.5
RhB------------- Riverhead	IIs	23	115	4.5	4.0	80	55	7.5

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn silage	Corn	Alfalfa hay	Grass-legume hay	Oats	Winter wheat	Pasture
		Tons	Bu	Tons	Tons	Bu	Bu	AUM*
RhC-------------- Riverhead	IIIe	17	85	4.5	3.5	65	50	6.5
Sa--------------- Saprists and Aquents	VIIIw	---	---	---	---	---	---	---
ScA-------------- Scio	IIw	23	115	4.0	4.5	85	60	8.5
ScB-------------- Scio	IIe	23	115	4.0	4.5	85	60	8.5
Te--------------- Teel	IIw	24	120	4.5	4.5	80	60	8.5
Th--------------- Teel	IIIw	19	90	3.5	4.0	60	---	7.5
Tr--------------- Trestle	I	24	120	5.5	4.0	85	55	7.5
Tu--------------- Tuller	IVw	10	50	---	2.0	40	---	4.0
Ud--------------- Udifluvents-Fluvaquents	Vw	---	---	---	---	---	---	2.0
Ue**. Udorthents								
UnA-------------- Unadilla	I	25	125	5.5	4.5	90	65	8.5
UnB-------------- Unadilla	IIe	25	125	5.5	4.5	90	65	8.5
VaB-------------- Valois	IIe	22	110	5.0	4.0	80	60	7.5
VaC-------------- Valois	IIIe.	18	90	4.5	3.5	75	55	6.5
VaD-------------- Valois	IVe	14	70	3.5	3.0	70	50	6.0
VaE-------------- Valois	VIe	---	---	---	---	---	---	---
VaF-------------- Valois	VIIe	---	---	---	---	---	---	---
VoA-------------- Volusia	IIIw	16	80	3.0	3.5	50	35	6.5
VoB-------------- Volusia	IIIw	16	80	3.0	3.5	50	30	6.5
VoC-------------- Volusia	IIIe	14	70	2.5	3.0	40	30	6.0
VpB-------------- Volusia and Morris	VIIs	---	---	---	---	---	---	3.0
Wa--------------- Wayland	Vw	---	---	---	2.0	---	---	4.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn silage	Corn	Alfalfa hay	Grass-legume hay	Oats	Winter wheat	Pasture
		Tons	Bu	Tons	Tons	Bu	Bu	AUM*
WeB-------------- Wellsboro	IIw	19	90	3.5	4.0	70	40	7.5
WeC-------------- Wellsboro	IIIe	16	80	3.0	3.5	65	40	6.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	9,386	---	---	---	---
II	142,722	55,916	63,747	23,059	---
III	227,090	155,223	71,867	---	---
IV	66,451	58,527	7,924	---	---
V	16,222	---	16,222	---	---
VI	65,133	45,279	---	19,854	---
VII	49,561	9,315	---	40,246	---
VIII	555	---	555	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available. The listings in the column "Trees to plant" include windbreaks and Christmas trees]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
Ad: Alden	5w	Slight	Severe	Severe	Severe	Red maple	50	Balsam fir, northern white-cedar.
						Hemlock	---	
ArB: Arkport	2o	Slight	Slight	Slight	Slight	Sugar maple	70	Norway spruce, red pine, eastern white pine, European larch, Japanese larch, Douglas-fir, balsam fir, Scotch pine, black locust, black walnut.
						Beech	---	
						Eastern white pine	85	
						Red maple	---	
						White ash	---	
						Black cherry	---	
						Basswood	---	
AsB, AsC: Arnot	4d	Slight	Slight	Severe	Moderate	Northern red oak	58	Eastern white pine.
						Sugar maple	60	
						Red maple	---	
						Eastern white pine	55	
						White ash	55	
						Black cherry	---	
						Beech	---	
At: Atherton	4w	Slight	Severe	Severe	Severe	Eastern white pine	62	Northern white-cedar.
						Red maple	60	
						Hemlock	---	
BaB, BaC: Bath	3o	Slight	Slight	Slight	Slight	Northern red oak	62	Eastern white pine, white spruce, red pine, Norway spruce, European larch, Japanese larch, Douglas-fir, balsam fir, black locust.
						Black cherry	77	
						Sugar maple	63	
						Red maple	---	
						White ash	---	
						Beech	---	
						Basswood	---	
BaD: Bath	3r	Slight	Moderate	Slight	Slight	Northern red oak	62	Eastern white pine, white spruce, red pine, Norway spruce, European larch, Japanese larch, Douglas-fir, balsam fir, black locust.
						Black cherry	77	
						Sugar maple	63	
						Red maple	---	
						White ash	---	
						Beech	---	
						Basswood	---	
BvB*, BvC*:								
Bath	3o	Slight	Slight	Slight	Slight	Northern red oak	62	Eastern white pine, red pine, Norway spruce, European larch, Japanese larch, Douglas-fir, balsam fir, black locust.
						Black cherry	77	
						Sugar maple	63	
						Red maple	---	
						White ash	---	
						Beech	---	
						Basswood	---	
Valois	3o	Slight	Slight	Slight	Slight	Northern red oak	62	Eastern white pine, white spruce, red pine, Norway spruce, European larch, Japanese larch, Douglas-fir, balsam fir.
						Black cherry	77	
						Sugar maple	63	
						Red maple	---	
						White ash	---	
						Beech	---	
						Basswood	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
BvD*:								
Bath	3r	Slight	Moderate	Slight	Slight	Northern red oak Black cherry Sugar maple Red maple White ash Beech Basswood	62 77 63 --- --- --- ---	Eastern white pine, white spruce, red pine, Norway spruce, European larch, Japanese larch, Douglas-fir, balsam fir, black locust.
Valois	3r	Slight	Moderate	Slight	Slight	Sugar maple Northern red oak White ash American basswood	67 70 70 70	Eastern white pine, white spruce, Norway spruce, red pine, European larch, Japanese larch, Douglas-fir, balsam fir, black locust.
Ca Canandaigua	4w	Slight	Severe	Severe	Severe	Red maple Hemlock	65 ---	Balsam fir, northern white-cedar.
CbB Canaseraga	2o	Slight	Slight	Slight	Slight	Eastern white pine White ash Sugar maple Black cherry Basswood Red maple	85 84 70 --- --- ---	European larch, Japanese larch, black locust, balsam fir, Douglas-fir, Norway spruce, white spruce, Scotch pine.
CbC Canaseraga	2r	Moderate	Slight	Slight	Slight	Eastern white pine White ash Red maple Sugar maple Red maple Black cherry Basswood	85 84 --- 70 --- --- ---	European larch, Japanese larch, black locust, balsam fir, Douglas-fir, Norway spruce, white spruce, Scotch pine.
Cc Carlisle	4w	Slight	Severe	Severe	Severe	Eastern cottonwood Black willow Red maple Hemlock Red spruce	80 --- --- --- ---	Eastern cottonwood, black willow.
CdA, CdB Castile	3o	Slight	Slight	Slight	Slight	Sugar maple Red maple Black cherry White ash Beech	63 --- 70 --- ---	Eastern white pine, red pine, Norway spruce, white spruce, European larch, Japanese larch, Douglas-fir, balsam fir, black locust.
ChA, ChB, ChC Chenango	2o	Slight	Slight	Slight	Slight	Sugar maple Red maple Black cherry White ash Beech	63 --- --- --- ---	Eastern white pine, red pine, European larch, Japanese larch, Douglas-fir, balsam fir, black locust, black walnut, Norway spruce.
ChD, ChE Chenango	2r	Slight	Moderate	Slight	Slight	Sugar maple Red maple Black cherry White ash Beech	63 --- 70 --- ---	Eastern white pine, red pine, European larch, Japanese larch, Douglas-fir, balsam fir, black locust, black walnut, Norway spruce.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
CkA, CkB----------- Chenango	2o	Slight	Slight	Slight	Slight	Sugar maple--------- Red maple----------- Black cherry-------- White ash----------- Beech---------------	63 --- 70 --- ---	Eastern white pine, red pine, European larch, Japanese larch, Douglas-fir, balsam fir, black locust, black walnut, Norway spruce.
Cm*, Cn*:-----------								
Chippewa	5w	Slight	Severe	Severe	Severe	Red maple----------- Hemlock-------------	50 ---	Northern white-cedar.
Norwich	5w	Slight	Severe	Severe	Severe	Red maple----------- Hemlock-------------	50 ---	Northern white-cedar.
GrB, GrC----------- Greene	5w	Slight	Severe	Severe	Severe	Red maple----------- Eastern hemlock----- Yellow birch-------- Eastern white pine--	55 45 50 55	Eastern white pine, white spruce, Norway spruce, Japanese larch, balsam fir, northern white-cedar.
Ha, Hb------------- Hamlin	2o	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- Red maple----------- Sycamore------------ Bur oak------------- Black cherry-------- Rock elm------------ Black willow--------	80 70 --- --- --- --- --- ---	Eastern white pine, red pine, black locust, Norway spruce, black walnut, European larch, Japanese larch, Douglas-fir, balsam fir, northern white-cedar.
HoA, HoB, HoC------ Howard	2o	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak---- Red maple----------- Shagbark hickory---- White ash----------- Bitternut hickory--- Black cherry--------	60 80 --- --- --- --- ---	Eastern white pine, European larch, black locust, red pine, Norway spruce, Japanese larch, balsam fir, Douglas-fir, black walnut.
HoD, HoE----------- Howard	2r	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- Red maple----------- Shagbark hickory---- White ash----------- Bitternut hickory--- Black cherry--------	60 80 --- --- --- --- ---	Eastern white pine, European larch, black locust, red pine, Norway spruce, Japanese larch, balsam fir, Douglas-fir, black walnut.
HpA, HpB, HpC------ Howard	2o	Slight	Slight	Slight	Slight	Sugar maple--------- Red maple----------- Northern red oak---- Shagbark hickory---- White ash----------- Bitternut hickory--- Black cherry--------	60 --- 80 --- --- --- ---	Eastern white pine, European larch, black locust, red pine, Norway spruce, Japanese larch, balsam fir, Douglas-fir, black walnut.
LaB, LaC----------- Lackawanna	3o	Slight	Slight	Slight	Slight	Northern red oak---- Black cherry-------- Sugar maple--------- White ash----------- Red maple-----------	70 75 61 70 ---	Eastern white pine, red pine, Norway spruce, European larch, Japanese larch, Douglas-fir, balsam fir, black locust, white spruce.
LaD, LaE----------- Lackawanna	3r	Slight	Moderate	Slight	Slight	Northern red oak---- Black cherry-------- Sugar maple--------- White ash-----------	70 75 61 70	Eastern white pine, red pine, Norway spruce, European larch, Japanese larch, Douglas-fir, balsam fir, black locust, white spruce.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Common trees	Site index	
LnB, LnC: Lansing	2o	Slight	Slight	Slight	Slight	Sugar maple Black cherry White ash Basswood Bitternut hickory Red maple	70 80 85 --- --- ---	Eastern white pine, red pine, white spruce, Norway spruce, European larch, black locust, black walnut, Douglas-fir, balsam fir, Japanese larch, Scotch pine.
LnD: Lansing	2r	Moderate	Moderate	Slight	Slight	Sugar maple Red maple Black cherry White ash Basswood Bitternut hickory	70 --- 80 85 --- ---	Eastern white pine, red pine, white spruce, Norway spruce, European larch, black locust, black walnut, Douglas-fir, balsam fir, Japanese larch, Scotch pine.
LoB, LoC: Lordstown	3o	Slight	Slight	Slight	Slight	Northern red oak Sugar maple White ash Red maple Basswood Beech Black cherry	55 61 75 --- --- --- ---	Eastern white pine, white spruce, European larch, red pine, Norway spruce, balsam fir, Douglas-fir, black locust, Japanese larch, Scotch pine.
LrE*:								
Lordstown	3r	Slight	Moderate	Slight	Slight	Northern red oak Sugar maple White ash Basswood Black cherry Hemlock Red maple	55 61 --- --- --- --- ---	Eastern white pine, European larch, red pine, Norway spruce, balsam fir, Douglas-fir, black locust, Japanese larch, Scotch pine.
Oquaga	3r	Slight	Moderate	Slight	Slight	Sugar maple Northern red oak Black cherry Eastern white pine White oak Hemlock Red maple	60 52 72 75 --- --- ---	Eastern white pine, white spruce, European larch, red pine, Norway spruce, balsam fir, Douglas-fir, black locust, Japanese larch, Scotch pine.
LrF*:								
Lordstown	3r	Moderate	Severe	Slight	Slight	Northern red oak Red maple Sugar maple White ash Hemlock Yellow birch Beech Black cherry	55 --- 61 75 --- --- --- ---	Eastern white pine, white spruce, European larch, red pine, Norway spruce, balsam fir, Douglas-fir, black locust, Japanese larch, Scotch pine.
Oquaga	3r	Moderate	Severe	Slight	Slight	Sugar maple Northern red oak Black cherry Hemlock Yellow birch Beech White ash Red maple	60 52 72 --- --- --- --- ---	Eastern white pine, white spruce, European larch, red pine, Norway spruce, balsam fir, Douglas-fir, black locust, Japanese larch, Scotch pine.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
MaB, MaC----------- Mardin	3o	Slight	Slight	Slight	Slight	Sugar maple--------- Red maple----------- Northern red oak---- Black cherry-------- White ash----------- Beech--------------- Basswood------------	63 --- 61 70 73 --- ---	Red pine, European larch, Norway spruce, eastern white pine, white spruce, Japanese larch, Scotch pine, Douglas-fir, balsam fir, black locust.
MaD---------------- Mardin	3r	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- Black cherry-------- White ash----------- Beech--------------- Basswood------------ Red maple-----------	63 61 70 73 --- --- ---	Red pine, European larch, Norway spruce, eastern white pine, white spruce, Japanese larch, Scotch pine, Douglas-fir, balsam fir, black locust.
MbE*: Mardin------------	3r	Slight	Moderate	Slight	Slight	Sugar maple--------- Red maple----------- Northern red oak---- Black cherry-------- White ash----------- Beech--------------- Basswood------------	63 --- 61 70 73 --- ---	Red pine, European larch, Norway spruce, eastern white pine, white spruce, Japanese larch, Scotch pine, Douglas-fir, balsam fir, black locust.
Lackawanna---------	3r	Slight	Moderate	Slight	Slight	Northern red oak---- Black cherry-------- Sugar maple--------- White ash----------- Red maple-----------	70 75 61 70 ---	Eastern white pine, red pine, Norway spruce, European larch, Japanese larch, balsam fir, black locust, white spruce.
McB*, McC*: Mardin------------	3o	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak---- Black cherry-------- White ash----------- Red maple-----------	63 61 70 73 ---	Red pine, European larch, Norway spruce, eastern white pine, white spruce, Japanese larch, Scotch pine, Douglas-fir, balsam fir, black locust.
Wellsboro---------	2o	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- Black cherry-------- White ash----------- Red maple-----------	78 61 --- 80 ---	Red pine, European larch, Norway spruce, eastern white pine, white spruce, Japanese larch, Scotch pine, Douglas-fir, balsam fir, black locust.
MoA, MoB, MoC------ Morris	3w	Slight	Moderate	Moderate	Moderate	Red maple----------- Sugar maple--------- Black cherry-------- White ash----------- Basswood------------ Beech---------------	--- 66 69 73 --- 	Eastern white pine, Norway spruce, white spruce, European larch, Japanese larch, balsam fir, Scotch pine.
OaB, OaC----------- Oquaga	3o	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak---- Black cherry-------- Eastern white pine-- White oak----------- Red maple-----------	60 52 72 75 --- ---	Eastern white pine, red pine, European larch, Norway spruce, black cherry.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
OlB*, OlC*:								
Oquaga	3o	Slight	Slight	Slight	Slight	Sugar maple	60	Eastern white pine, red pine, European larch, Norway spruce, black cherry.
						Northern red oak	52	
						Black cherry	72	
						Eastern white pine	75	
						White oak	---	
						Red maple	---	
Lordstown	3o	Slight	Slight	Slight	Slight	Sugar maple	61	Eastern white pine, red pine, European larch, Norway spruce.
						Red maple	---	
						Northern red oak	55	
						Basswood	---	
						Black cherry	---	
						Beech	---	
OlE*:								
Oquaga	3r	Slight	Moderate	Slight	Slight	Sugar maple	60	Eastern white pine, red pine, European larch, Norway spruce.
						Red maple	---	
						Northern red oak	52	
						White ash	62	
						Hemlock	---	
Lordstown	3r	Slight	Moderate	Slight	Slight	Sugar maple	61	Eastern white pine, red pine, European larch, Norway spruce.
						Northern red oak	55	
						White ash	75	
						Hemlock	---	
						Yellow birch	---	
						Beech	---	
						Black cherry	---	
PhA, PhB: Phelps	2o	Slight	Slight	Slight	Slight	Sugar maple	---	Eastern white pine, red pine, Norway spruce, European larch, white spruce, Japanese larch, balsam fir, Douglas-fir, black locust.
						Red maple	---	
						White ash	84	
						Beech	---	
						Black cherry	---	
						Shagbark hickory	---	
						Bitternut hickory	---	
Ra: Raynham	4w	Slight	Severe	Severe	Severe	Red maple	64	Eastern white pine, black walnut, balsam fir, northern white-cedar.
Re: Red Hook	3w	Slight	Moderate	Moderate	Moderate	Red maple	70	Eastern white pine, Norway spruce, white spruce, balsam fir.
						Eastern white pine	70	
RhB, RhC: Riverhead	3o	Slight	Slight	Slight	Slight	Sugar maple	63	Eastern white pine, red pine, Scotch pine, Norway spruce, European larch, Japanese larch, balsam fir, Douglas-fir, black locust, black walnut.
						Northern red oak	70	
						Black cherry	70	
						Eastern white pine	75	
						Beech	---	
						Basswood	---	
						White ash	---	
						Red maple	---	
ScA, ScB: Scio	2o	Slight	Slight	Slight	Slight	White ash	85	European larch, Scotch pine, eastern white pine, red pine, Norway spruce, white spruce, balsam fir, Douglas-fir, Japanese larch, black walnut, black locust.
						Sugar maple	70	
						Black cherry	80	
						Red maple	---	
						Eastern white pine	---	
						Sycamore	---	
						Beech	---	
						Basswood	---	
						Butternut	---	
						Shagbark hickory	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
Te: Teel	2o	Slight	Slight	Slight	Slight	White ash	85	Eastern white pine, Norway spruce, black walnut, European larch.
						Sugar maple	70	
						Black cherry	80	
						Red maple	---	
						Eastern white pine	85	
						Sycamore	---	
						Beech	---	
						Basswood	---	
						Butternut	---	
						Shagbark hickory	---	
Th: Teel	3w	Slight	Moderate	Moderate	Moderate	Red maple	70	Eastern white pine, balsam fir, northern white-cedar.
Tr: Trestle	2o	Slight	Slight	Slight	Slight	Sugar maple	70	Eastern white pine, black locust, Norway spruce, black walnut, European larch, red pine, Scotch pine, balsam fir, Douglas-fir, white spruce.
						Beech	---	
						Black cherry	---	
						Sycamore	---	
						White ash	---	
						Red maple	---	
Tu: Tuller	5w	Slight	Severe	Severe	Severe	Red maple	55	Eastern white pine, white spruce, balsam fir, northern white-cedar.
						American beech	---	
						American elm	---	
						Eastern hemlock	45	
UnA, UnB: Unadilla	2o	Slight	Slight	Slight	Slight	Sugar maple	70	Eastern white pine, Norway spruce, European larch, red pine, white spruce, Scotch pine, black locust, black walnut, Japanese larch, balsam fir, Douglas-fir.
						Eastern white pine	85	
						Black cherry	80	
						White ash	95	
						Hickory	---	
						Beech	---	
						Red maple	---	
VaB, VaC: Valois	3o	Slight	Slight	Slight	Slight	Sugar maple	67	Eastern white pine, white spruce, Norway spruce, red pine, European larch, Japanese larch, balsam fir, Douglas-fir, black locust.
						Northern red oak	70	
						White ash	93	
						American basswood	70	
						Beech	---	
						Black cherry	---	
						Red maple	---	
VaD, VaE: Valois	3r	Slight	Moderate	Slight	Slight	Sugar maple	67	Eastern white pine, white spruce, Norway spruce, red pine, European larch, Japanese larch, balsam fir, Douglas-fir, black locust.
						Northern red oak	70	
						White ash	93	
						American basswood	70	
						Beech	---	
						Black cherry	---	
						Red maple	---	
VaF: Valois	3r	Moderate	Severe	Slight	Slight	Sugar maple	67	Eastern white pine, white spruce, Norway spruce, red pine, European larch, Japanese larch, balsam fir, Douglas-fir, black locust.
						Northern red oak	70	
						White ash	93	
						American basswood	70	
						Beech	---	
						Black cherry	---	
						Red maple	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
VoA, VoB, VoC------ Volusia	3w	Slight	Moderate	Moderate	Moderate	Sugar maple--------- White ash----------- Red maple-----------	59 75 ---	Eastern white pine, balsam fir, Norway spruce, Scotch pine, European larch, white spruce, Japanese larch.
VpB*:								
Volusia-----------	3w	Slight	Moderate	Moderate	Moderate	Red maple----------- Sugar maple--------- White ash----------- Basswood------------ Beech--------------- Hemlock-------------	--- 59 75 --- --- ---	Eastern white pine, balsam fir, Norway spruce, Scotch pine, European larch, white spruce, Japanese larch.
Morris------------	3w	Slight	Moderate	Moderate	Moderate	Sugar maple--------- Black cherry-------- Red maple----------- Basswood------------ Beech---------------	66 69 --- --- ---	Eastern white pine, balsam fir, Norway spruce, Scotch pine, European larch, white spruce, Japanese larch.
Wa----------------- Wayland	4w	Slight	Severe	Severe	Severe	Red maple-----------	65	Willow.
WeB, WeC----------- Wellsboro	2o	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- Red maple-----------	78 61 ---	Norway spruce, eastern white pine, red pine, black cherry, European larch.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ad: Alden	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus, erodes easily.	Severe: wetness.
ArB: Arkport	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
AsB: Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones.	Slight	Severe: thin layer.
AsC: Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones.	Slight	Severe: thin layer.
At: Atherton	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness.
BaB: Bath	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight	Moderate: large stones.
BaC: Bath	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: slope, small stones.	Slight	Moderate: large stones, slope.
BaD: Bath	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
BvB*:					
Bath	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight	Moderate: large stones.
Valois	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
BvC*:					
Bath	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: slope, small stones.	Slight	Moderate: large stones, slope.
Valois	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: slope, small stones.
BvD*:					
Bath	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Valois	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Ca: Canandaigua	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: wetness.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CbB------------------- Canaseraga	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Moderate: wetness.
CbC------------------- Canaseraga	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: wetness, slope.
Cc-------------------- Carlisle	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
CdA, CdB-------------- Castile	Moderate: small stones, wetness.	Moderate: small stones, wetness.	Severe: small stones.	Moderate: wetness.	Moderate: small stones, wetness.
ChA, ChB-------------- Chenango	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones.
ChC------------------- Chenango	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope.
ChD------------------- Chenango	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
ChE------------------- Chenango	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CkA, CkB-------------- Chenango	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones, large stones, droughty.
Cm*:					
Chippewa--------------	Severe: wetness, percs slowly, excess humus.	Severe: wetness, percs slowly, excess humus.	Severe: small stones, wetness, percs slowly.	Severe: wetness, excess humus.	Severe: wetness.
Norwich---------------	Severe: wetness, percs slowly, excess humus.	Severe: wetness, excess humus, percs slowly.	Severe: excess humus, wetness, percs slowly.	Severe: wetness, excess humus.	Severe: wetness.
Cn*:					
Chippewa--------------	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: large stones, wetness, percs slowly.	Severe: wetness, excess humus.	Severe: wetness.
Norwich---------------	Severe: wetness, percs slowly.	Severe: wetness, excess humus.	Severe: large stones, wetness.	Severe: wetness, excess humus.	Severe: wetness.
GrB, GrC-------------- Greene	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ha-------------------- Hamlin	Severe: flooding.	Slight----------	Moderate: flooding.	Slight----------	Moderate: flooding.
Hb-------------------- Hamlin	Severe: flooding.	Slight----------	Slight----------	Slight----------	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HoA, HoB: Howard	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
HoC: Howard	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
HoD: Howard	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
HoE: Howard	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
HpA: Howard	Slight	Slight	Moderate: small stones.	Slight	Slight.
HpB: Howard	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
HpC: Howard	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
LaB: Lackawanna	Moderate: percs slowly.	Moderate: percs slowly.	Severe: small stones.	Slight	Moderate: small stones.
LaC: Lackawanna	Moderate: slope, small stones.	Moderate: small stones, slope.	Severe: small stones, slope.	Slight	Moderate: small stones, slope.
LaD: Lackawanna	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope.	Severe: slope.
LaE: Lackawanna	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope.
LnB: Lansing	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
LnC: Lansing	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
LnD: Lansing	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
LoB: Lordstown	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: large stones, thin layer.
LoC: Lordstown	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: large stones, thin layer, slope.
LrE*, LrF*: Lordstown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LrE*, LrF*:					
Oquaga	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
MaB Mardin	Severe: percs slowly.	Severe: percs slowly.	Severe: small stones, percs slowly.	Slight	Moderate: small stones.
MaC Mardin	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, small stones, percs slowly.	Slight	Moderate: small stones, slope.
MaD Mardin	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, small stones, percs slowly.	Moderate: slope.	Severe: slope.
MbE*:					
Mardin	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Lackawanna	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
McB*:					
Mardin	Severe: percs slowly.	Severe: percs slowly.	Severe: large stones, small stones.	Moderate: wetness.	Moderate: large stones, wetness.
Wellsboro	Moderate: large stones, percs slowly.	Moderate: large stones.	Severe: large stones.	Moderate: wetness.	Moderate: large stones.
McC*:					
Mardin	Severe: percs slowly.	Severe: percs slowly.	Severe: large stones, slope, small stones.	Moderate: wetness.	Moderate: large stones, wetness, slope.
Wellsboro	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: wetness.	Moderate: large stones, slope.
MoA, MoB Morris	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness.
MoC Morris	Severe: wetness.	Severe: wetness.	Severe: slope, small stones, wetness.	Severe: wetness.	Severe: wetness.
OaB Oquaga	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones.
OaC Oquaga	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
OlB*:					
Oquaga	Severe: small stones.	Severe: small stones.	Severe: large stones, small stones.	Slight	Severe: small stones.
Lordstown	Moderate: large stones.	Moderate: large stones.	Severe: large stones, small stones.	Slight	Moderate: large stones, thin layer.
OlC*:					
Oquaga	Severe: small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Slight	Severe: small stones.
Lordstown	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones, small stones.	Slight	Moderate: large stones, slope, thin layer.
OlE*:					
Oquaga	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: small stones, slope.
Lordstown	Severe: slope.	Severe: slope.	Severe: slope, large stones, small stones.	Severe: slope.	Severe: slope.
PhA, PhB Phelps	Moderate: small stones, wetness.	Moderate: wetness, small stones.	Severe: small stones.	Moderate: wetness.	Moderate: small stones, large stones, wetness.
Pt*, Pu*. Pits					
Ra Raynham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
Re Red Hook	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
RhB Riverhead	Slight	Slight	Moderate: slope.	Slight	Slight.
RhC Riverhead	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Sa*: Saprists.					
Aquents.					
ScA Scio	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
ScB Scio	Severe: flooding.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: erodes easily, wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Te: Teel	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Severe: erodes easily.	Moderate: wetness, flooding.
Th: Teel	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, erodes easily.	Severe: wetness, flooding.
Tr: Trestle	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding.
Tu: Tuller	Severe: wetness, depth to rock.	Severe: wetness, depth to rock.	Severe: small stones, wetness, depth to rock.	Severe: wetness.	Severe: wetness, thin layer.
Ud*: Udifluvents.					
Ue*. Udorthents					
UnA: Unadilla	Severe: flooding.	Slight	Slight	Slight	Slight.
UnB: Unadilla	Severe: flooding.	Slight	Moderate: slope.	Moderate: erodes easily.	Slight.
VaB: Valois	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
VaC: Valois	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: slope, small stones.
VaD: Valois	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
VaE, VaF: Valois	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
VoA, VoB: Volusia	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness, droughty.
VoC: Volusia	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, small stones, wetness.	Severe: wetness.	Severe: wetness, droughty.
VpB*:					
Volusia	Severe: wetness.	Severe: wetness.	Severe: large stones, slope, wetness.	Severe: wetness.	Severe: wetness, droughty.
Morris	Severe: wetness.	Severe: wetness.	Severe: wetness, large stones, slope.	Severe: wetness.	Severe: wetness.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Wa-------------------- Wayland	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness, flooding.	Severe: wetness, excess humus.	Severe: wetness, flooding.
WeB------------------- Wellsboro	Moderate: percs slowly, wetness.	Moderate: wetness, percs slowly.	Severe: small stones.	Severe: slope.	Moderate: large stones.
WeC------------------- Wellsboro	Moderate: slope, percs slowly, wetness.	Moderate: slope, wetness, percs slowly.	Severe: slope, small stones.	Severe: slope.	Moderate: slope, large stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Ad------------------ Alden	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.
ArB----------------- Arkport	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
AsB, AsC------------ Arnot	Poor	Poor	Fair	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.
At------------------ Atherton	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.
BaB----------------- Bath	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
BaC----------------- Bath	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
BaD----------------- Bath	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
BvB*:											
Bath----------------	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Valois--------------	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
BvC*:											
Bath----------------	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Valois--------------	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
BvD*:											
Bath----------------	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Valois--------------	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Ca------------------ Canandaigua	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Very poor.	Poor	Good.
CbB----------------- Canaseraga	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
CbC----------------- Canaseraga	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Cc------------------ Carlisle	Fair	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.
CdA----------------- Castile	Fair	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
CdB----------------- Castile	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
ChA, ChB, ChC------- Chenango	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
ChD------------------ Chenango	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
ChE------------------ Chenango	Very poor.	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
CkA, CkB------------ Chenango	Fair	Good	Good	Fair	Fair	---	Poor	Very poor.	Good	Fair	Very poor.
Cm*:											
Chippewa-----------	Poor	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good.
Norwich------------	Poor	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good.
Cn*:											
Chippewa-----------	Very poor.	Poor	Fair	Fair	Fair	---	Good	Good	Poor	Fair	Good.
Norwich------------	Very poor.	Poor	Fair	Fair	Fair	---	Good	Good	Poor	Fair	Good.
GrB------------------ Greene	Fair	Fair	Fair	Fair	Fair	---	Poor	Very poor.	Fair	Fair	Very poor.
GrC------------------ Greene	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
Ha, Hb-------------- Hamlin	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
HoA, HoB, HoC------- Howard	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
HoD------------------ Howard	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
HoE------------------ Howard	Very poor.	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
HpA, HpB, HpC------- Howard	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
LaB------------------ Lackawanna	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
LaC------------------ Lackawanna	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
LaD------------------ Lackawanna	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
LaE------------------ Lackawanna	Very poor.	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
LnB------------------ Lansing	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
LnC------------------ Lansing	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
LnD------------------ Lansing	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
LoB------------------ Lordstown	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
LoC----------------- Lordstown	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
LrE*:											
Lordstown----------	Very poor.	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Oquaga-------------	Very poor.	Fair	Good	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
LrF*:											
Lordstown----------	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Poor	Fair	Very poor.
Oquaga-------------	Very poor.	Poor	Good	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
MaB----------------- Mardin	Fair	Good	Good	Fair	Fair	---	Poor	Very poor.	Good	Fair	Very poor.
MaC----------------- Mardin	Fair	Good	Good	Fair	Fair	---	Very poor.	Very poor.	Good	Fair	Very poor.
MaD----------------- Mardin	Poor	Fair	Good	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
MbE*:											
Mardin-------------	Very poor.	Poor	Good	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
Lackawanna---------	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
McB*:											
Mardin-------------	Very poor.	Poor	Good	Fair	Fair	---	Poor	Very poor.	Poor	Fair	Very poor.
Wellsboro----------	Very poor.	Poor	Good	Fair	Fair	---	Poor	Very poor.	Poor	Fair	Very poor.
McC*:											
Mardin-------------	Very poor.	Poor	Good	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
Wellsboro----------	Very poor.	Poor	Good	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
MoA----------------- Morris	Fair	Good	Good	Fair	Fair	---	Fair	Fair	Good	Fair	Fair.
MoB----------------- Morris	Fair	Good	Good	Fair	Fair	---	Poor	Very poor.	Good	Fair	Very poor.
MoC----------------- Morris	Fair	Good	Good	Fair	Fair	---	Very poor.	Very poor.	Good	Fair	Very poor.
OaB----------------- Oquaga	Fair	Good	Good	Fair	Fair	---	Very poor.	Very poor.	Good	Fair	Very poor.
OaC----------------- Oquaga	Fair	Good	Good	Fair	Fair	---	Very poor.	Very poor.	Good	Fair	Very poor.
OlB*:											
Oquaga-------------	Very poor.	Very poor.	Good	Fair	Fair	---	Poor	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
OlB*: Lordstown	Very poor.	Very poor.	Good	Good	Good	---	Poor	Very poor.	Poor	Good	Very poor.
OlC*, OlE*: Oquaga	Very poor.	Very poor.	Good	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
Lordstown	Very poor.	Very poor.	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
PhA Phelps	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
PhB Phelps	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Pt*, Pu*. Pits											
Ra Raynham	Fair	Fair	Fair	Fair	Fair	---	Good	Fair	Fair	Fair	Fair.
Re Red Hook	Fair	Good	Good	Good	Good	---	Fair	Fair	Good	Good	Fair.
RhB, RhC Riverhead	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Sa*: Saprists.											
Aquents.											
ScA Scio	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
ScB Scio	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Te Teel	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
Th Teel	Fair	Good	Good	Good	Good	---	Fair	Fair	Good	Good	Fair.
Tr Trestle	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Tu Tuller	Very poor.	Poor	Poor	Very poor.	Very poor.	---	Fair	Poor	Poor	Very poor.	Poor.
Ud*: Udifluvents.											
Fluvaquents.											
Ue*. Udorthents											
UnA, UnB Unadilla	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
VaB Valois	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
VaC----------------- Valois	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
VaD----------------- Valois	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
VaE----------------- Valois	Very poor.	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
VaF----------------- Valois	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
VoA----------------- Volusia	Fair	Fair	Fair	Poor	Poor	---	Fair	Fair	Fair	Poor	Fair.
VoB----------------- Volusia	Fair	Fair	Fair	Poor	Poor	---	Poor	Very poor.	Fair	Poor	Very poor.
VoC----------------- Volusia	Fair	Fair	Fair	Poor	Poor	---	Very poor.	Very poor.	Fair	Poor	Very poor.
VpB*:											
Volusia------------	Very poor.	Poor	Fair	Poor	Poor	---	Poor	Very poor.	Poor	Poor	Very poor.
Morris------------	Very poor.	Poor	Good	Fair	Fair	---	Poor	Very poor.	Poor	Fair	Very poor.
Wa------------------ Wayland	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.
WeB----------------- Wellsboro	Fair	Good	Good	Fair	Fair	---	Poor	Very poor.	Good	Fair	Very poor.
WeC----------------- Wellsboro	Fair	Good	Good	Fair	Fair	---	Very poor.	Very poor.	Good	Fair	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ad----------------- Alden	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
ArB---------------- Arkport	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
AsB---------------- Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: thin layer.
AsC---------------- Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
At----------------- Atherton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
BaB---------------- Bath	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: large stones.
BaC---------------- Bath	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: large stones, slope.
BaD---------------- Bath	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BvB*:						
Bath-------------	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: large stones.
Valois-----------	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: small stones.
BvC*:						
Bath-------------	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: large stones, slope.
Valois-----------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
BvD*:						
Bath-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Valois-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ca----------------- Canandaigua	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: wetness.
CbB---------------- Canaseraga	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
CbC---------------- Canaseraga	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: wetness, slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Cc: Carlisle	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, frost action.	Severe: ponding, excess humus.
CdA: Castile	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Moderate: small stones, wetness.
CdB: Castile	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: small stones, wetness.
ChA: Chenango	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Moderate: small stones.
ChB: Chenango	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: small stones.
ChC: Chenango	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope.
ChD, ChE: Chenango	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CkA, CkB: Chenango	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.	Moderate: small stones, large stones, droughty.
Cm*, Cn*:						
Chippewa	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Norwich	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
GrB: Greene	Severe: depth to rock, wetness.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness.	Severe: wetness.
GrC: Greene	Severe: depth to rock, wetness.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.
Ha: Hamlin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Moderate: flooding.
Hb: Hamlin	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.	Slight.
HoA: Howard	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Moderate: small stones.
HoB: Howard	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: small stones.
HoC: Howard	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope.
HoD, HoE: Howard	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HpA---------------Howard	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Slight.
HpB---------------Howard	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Slight.
HpC---------------Howard	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
LaB---------------Lackawanna	Moderate: wetness.	Slight---------	Moderate: wetness.	Slight---------	Moderate: frost action.	Moderate: small stones.
LaC---------------Lackawanna	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Moderate: slope.	Moderate: frost action, slope.	Moderate: small stones, slope.
LaD, LaE----------Lackawanna	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LnB---------------Lansing	Moderate: dense layer.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: small stones.
LnC---------------Lansing	Moderate: dense layer, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope.
LnD---------------Lansing	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LoB---------------Lordstown	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Moderate: large stones, thin layer.
LoC---------------Lordstown	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: large stones, thin layer, slope.
LrE*, LrF*:						
Lordstown--------	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Oquaga-----------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
MaB---------------Mardin	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Moderate: small stones.
MaC---------------Mardin	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: small stones, slope.
MaD---------------Mardin	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.
MbE*:						
Mardin-----------	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.
Lackawanna-------	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
McB*:						
Mardin	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: frost action, wetness.	Moderate: large stones, wetness.
Wellsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: frost action.	Moderate: large stones.
McC*:						
Mardin	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: large stones, wetness, slope.
Wellsboro	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: large stones, slope.
MoA, MoB Morris	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, wetness.	Severe: wetness.
MoC Morris	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: frost action, wetness.	Severe: wetness.
OaB Oquaga	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Severe: small stones.
OaC Oquaga	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Severe: small stones.
OlB*:						
Oquaga	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Severe: small stones.
Lordstown	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Moderate: large stones, thin layer.
OlC*:						
Oquaga	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Severe: small stones.
Lordstown	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Moderate: large stones, slope, thin layer.
OlE*:						
Oquaga	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Lordstown	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
PhA Phelps	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Moderate: small stones, large stones, wetness.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
PhB---------------- Phelps	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: small stones, large stones, wetness.
Pt*, Pu*. Pits						
Ra----------------- Raynham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, wetness.	Severe: wetness.
Re----------------- Red Hook	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
RhB---------------- Riverhead	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Slight.
RhC---------------- Riverhead	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
Sa*: Saprists.						
Aquents.						
ScA, ScB---------- Scio	Severe: wetness, cutbanks cave.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action.	Moderate: wetness.
Te----------------- Teel	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Moderate: wetness, flooding.
Th----------------- Teel	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength.	Severe: wetness, flooding.
Tr----------------- Trestle	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Tu----------------- Tuller	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, frost action.	Severe: wetness, thin layer.
Ud*: Udifluvents.						
Fluvaquents.						
Ue*. Udorthents						
UnA, UnB---------- Unadilla	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.	Slight.
VaB---------------- Valois	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: small stones.
VaC---------------- Valois	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
VaD, VaE, VaF----- Valois	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
VoA, VoB: Volusia	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, droughty.
VoC: Volusia	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness, droughty.
VpB*:						
Volusia	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, droughty.
Morris	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, wetness.	Severe: wetness.
Wa: Wayland	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
WeB: Wellsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: frost action.	Moderate: large stones.
WeC: Wellsboro	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: slope, large stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ad: Alden	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
ArB: Arkport	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Fair: too sandy, thin layer.
AsB: Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
AsC: Arnot	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
At: Atherton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness, thin layer.
BaB: Bath	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: wetness.	Moderate: wetness.	Poor: small stones.
BaC: Bath	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Poor: small stones.
BaD: Bath	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
BvB*:					
Bath	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: wetness.	Moderate: wetness.	Poor: small stones.
Valois	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
BvC*:					
Bath	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Poor: small stones.
Valois	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
BvD*:					
Bath	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Valois	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Ca: Canandaigua	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CbB------------------ Canaseraga	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
CbC------------------ Canaseraga	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
Cc------------------- Carlisle	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
CdA, CdB------------- Castile	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy, small stones.
ChA, ChB------------- Chenango	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
ChC------------------ Chenango	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
ChD, ChE------------- Chenango	Severe: poor filter, slope.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: seepage, too sandy, small stones.
CkA, CkB------------- Chenango	Severe: wetness, poor filter.	Severe: flooding, seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: small stones, seepage, too sandy.
Cm*:					
Chippewa------------	Severe: wetness, percs slowly.	Slight------------	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
Norwich-------------	Severe: wetness, percs slowly.	Slight------------	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
Cn*:					
Chippewa------------	Severe: wetness, percs slowly.	Moderate: large stones.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
Norwich-------------	Severe: wetness, percs slowly.	Moderate: large stones.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
GrB------------------ Greene	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: area reclaim.
GrC------------------ Greene	Severe: depth to rock, wetness, percs slowly.	Severe: slope, depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: area reclaim.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ha------------------ Hamlin	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Hb------------------ Hamlin	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
HoA, HoB------------ Howard	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
HoC----------------- Howard	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
HoD, HoE------------ Howard	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
HpA, HpB------------ Howard	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
HpC----------------- Howard	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
LaB----------------- Lackawanna	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: wetness.	Moderate: wetness.	Poor: small stones.
LaC----------------- Lackawanna	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Poor: small stones.
LaD, LaE------------ Lackawanna	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
LnB----------------- Lansing	Severe: percs slowly.	Moderate: seepage, slope.	Slight-----------	Slight-----------	Fair: small stones.
LnC----------------- Lansing	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
LnD----------------- Lansing	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
LoB----------------- Lordstown	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
LoC----------------- Lordstown	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
LrE*, LrF*:					
Lordstown----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Poor: area reclaim, slope, thin layer.
Oquaga-------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MaB: Mardin	Severe: percs slowly, wetness.	Moderate: slope, seepage.	Severe: wetness.	Moderate: wetness.	Poor: small stones.
MaC: Mardin	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Moderate: slope, wetness.	Poor: small stones.
MaD: Mardin	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Poor: slope, small stones.
MbE*:					
Mardin	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Poor: small stones, slope.
Lackawanna	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
McB*:					
Mardin	Severe: percs slowly, wetness.	Moderate: slope, seepage.	Severe: wetness.	Moderate: wetness.	Poor: small stones.
Wellsboro	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Poor: small stones.
McC*:					
Mardin	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Moderate: slope, wetness.	Poor: small stones.
Wellsboro	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Poor: small stones.
MoA: Morris	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness, small stones.
MoB: Morris	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness, small stones.
MoC: Morris	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness, small stones.
OaB: Oquaga	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
OaC: Oquaga	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
OlB*:					
Oquaga	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
OlB*:					
Lordstown----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
OlC*:					
Oquaga-------------	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
Lordstown----------	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
OlE*:					
Oquaga-------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Lordstown----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Poor: area reclaim, slope, thin layer.
PhA, PhB------------ Phelps	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
Pt*, Pu*. Pits					
Ra------------------ Raynham	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Re------------------ Red Hook	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
RhB----------------- Riverhead	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
RhC----------------- Riverhead	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Sa*: Saprists.					
Aquents.					
ScA, ScB------------ Scio	Severe: wetness, poor filter.	Severe: flooding, seepage.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness, thin layer.
Te------------------ Teel	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Th------------------ Teel	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Tr------------------ Trestle	Severe: poor filter, flooding.	Severe: seepage, flooding.	Severe: seepage, wetness, flooding.	Severe: seepage, flooding.	Poor: seepage.
Tu------------------ Tuller	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: area reclaim, wetness, thin layer.
Ud*: Udifluvents.					
Fluvaquents.					
Ue*. Udorthents					
UnA, UnB------------ Unadilla	Moderate: flooding, poor filter.	Severe: flooding, seepage.	Severe: seepage.	Moderate: flooding.	Fair: thin layer.
VaB----------------- Valois	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
VaC----------------- Valois	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
VaD, VaE, VaF------- Valois	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
VoA----------------- Volusia	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness.	Severe: wetness.	Poor: wetness.
VoB----------------- Volusia	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
VoC----------------- Volusia	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
VpB*: Volusia------------	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
Morris-------------	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Wa------------------ Wayland	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
WeB----------------- Wellsboro	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Poor: small stones.
WeC----------------- Wellsboro	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Moderate: slope, wetness.	Poor: small stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ad: Alden	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones, area reclaim.
ArB: Arkport	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
AsB, AsC: Arnot	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
At: Atherton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
BaB, BaC: Bath	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
BaD: Bath	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
BvB*, BvC*:				
Bath	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Valois	Good	Improbable: small stones.	Improbable: excess fines.	Poor: small stones, area reclaim.
BvD*:				
Bath	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Valois	Fair: slope.	Improbable: small stones.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Ca: Canandaigua	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
CbB, CbC: Canaseraga	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Cc: Carlisle	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
CdA, CdB: Castile	Fair: wetness.	Probable	Probable	Poor: small stones, area reclaim.
ChA, ChB, ChC: Chenango	Good	Probable	Probable	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ChD------------------- Chenango	Fair: slope.	Probable-------------	Probable-------------	Poor: slope, small stones, area reclaim.
ChE------------------- Chenango	Poor: slope.	Probable-------------	Probable-------------	Poor: slope, small stones, area reclaim.
CkA, CkB-------------- Chenango	Good-----------------	Probable-------------	Probable-------------	Poor: small stones, area reclaim.
Cm*:				
Chippewa-------------	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, area reclaim, small stones.
Norwich--------------	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
Cn*:				
Chippewa-------------	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
Norwich--------------	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
GrB, GrC-------------- Greene	Poor: area reclaim, wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
Ha, Hb---------------- Hamlin	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
HoA, HoB, HoC--------- Howard	Good-----------------	Probable-------------	Probable-------------	Poor: small stones, area reclaim.
HoD------------------- Howard	Fair: slope.	Probable-------------	Probable-------------	Poor: small stones, area reclaim, slope.
HoE------------------- Howard	Poor: slope.	Probable-------------	Probable-------------	Poor: small stones, area reclaim, slope.
HpA, HpB, HpC--------- Howard	Good-----------------	Probable-------------	Probable-------------	Poor: small stones, area reclaim.
LaB, LaC-------------- Lackawanna	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LaD: Lackawanna	Fair: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
LaE: Lackawanna	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
LnB, LnC: Lansing	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
LnD: Lansing	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
LoB, LoC: Lordstown	Poor: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
LrE*, LrF*:				
Lordstown	Poor: slope, thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Oquaga	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
MaB, MaC: Mardin	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MaD: Mardin	Fair: slope, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
MbE*:				
Mardin	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, area reclaim, small stones.
Lackawanna	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
McB*, McC*:				
Mardin	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Wellsboro	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MoA, MoB, MoC: Morris	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
OaB, OaC: Oquaga	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
OlB*, OlC*:				
Oquaga	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Lordstown	Poor: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
OlE*:				
Oquaga	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Lordstown	Poor: slope, thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
PhA, PhB: Phelps	Fair: wetness.	Probable	Probable	Poor: small stones, area reclaim.
Pt*, Pu*. Pits				
Ra: Raynham	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Re: Red Hook	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
RhB, RhC: Riverhead	Good	Probable	Probable	Poor: small stones.
Sa*:				
Saprists.				
Aquents.				
ScA, ScB: Scio	Fair: wetness.	Probable	Probable	Fair: area reclaim.
Te: Teel	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
Th: Teel	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Tr: Trestle	Good	Improbable: small stones.	Improbable: excess fines.	Fair: small stones, area reclaim.
Tu: Tuller	Poor: area reclaim, wetness.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: area reclaim, small stones, wetness.
Ud*:				
Udifluvents.				
Fluvaquents.				
Ue*. Udorthents				

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
UnA, UnB: Unadilla	Good	Probable	Probable	Fair: area reclaim.
VaB, VaC: Valois	Good	Improbable: small stones.	Improbable: excess fines.	Poor: small stones, area reclaim.
VaD: Valois	Fair: slope.	Improbable: small stones.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
VaE, VaF: Valois	Poor: slope.	Improbable: small stones.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
VoA, VoB, VoC: Volusia	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, wetness.
VpB*:				
Volusia	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
Morris	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Wa: Wayland	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
WeB, WeC: Wellsboro	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
Ad: Alden	Slight	Severe: piping, wetness.	Slight	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, erodes easily, rooting depth.
ArB: Arkport	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable	Droughty.
AsB: Arnot	Severe: depth to rock.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, depth to rock.
AsC: Arnot	Severe: depth to rock, slope.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Large stones, slope, depth to rock.	Large stones, slope, depth to rock.
At: Atherton	Severe: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Frost action	Wetness	Wetness.
BaB: Bath	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Rooting depth, percs slowly.	Rooting depth, percs slowly.
BaC, BaD: Bath	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.
BvB*:						
Bath	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Rooting depth, percs slowly.	Rooting depth, percs slowly.
Valois	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable	Favorable.
BvC*, BvD*:						
Bath	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.
Valois	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
Ca: Canandaigua	Slight	Severe: piping, ponding.	Severe: slow refill.	Ponding, frost action.	Erodes easily, ponding.	Wetness, erodes easily.
CbB: Canaseraga	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
CbC: Canaseraga	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Cc: Carlisle	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Ponding, soil blowing.	Wetness.
CdA: Castile	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, too sandy.	Droughty.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
CdB----------------- Castile	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Frost action, slope, cutbanks cave.	Wetness, too sandy.	Droughty.
ChA, ChB----------- Chenango	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Too sandy------	Droughty.
ChC, ChD, ChE----- Chenango	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty.
CkA, CkB----------- Chenango	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Deep to water	Large stones, too sandy.	Droughty, large stones.
Cm*:						
Chippewa----------	Slight---------	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, rooting depth, percs slowly.	Wetness, rooting depth, percs slowly.
Norwich-----------	Slight---------	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, rooting depth, percs slowly.	Wetness, rooting depth, percs slowly.
Cn*:						
Chippewa----------	Slight---------	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Large stones, wetness, rooting depth.	Large stones, wetness, rooting depth.
Norwich-----------	Slight---------	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Large stones, wetness, rooting depth.	Large stones, wetness, rooting depth.
GrB----------------- Greene	Moderate: depth to rock.	Severe: thin layer.	Severe: no water.	Slope, percs slowly, depth to rock.	Depth to rock, wetness, percs slowly.	Wetness, depth to rock.
GrC----------------- Greene	Severe: slope.	Severe: thin layer.	Severe: no water.	Slope, percs slowly, depth to rock.	Slope, depth to rock, wetness.	Slope, wetness, depth to rock.
Ha------------------ Hamlin	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily	Erodes easily.
Hb------------------ Hamlin	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
HoA, HoB----------- Howard	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Favorable------	Droughty.
HoC, HoD, HoE----- Howard	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope-----------	Slope, droughty.
HpA, HpB----------- Howard	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Favorable------	Droughty.
HpC----------------- Howard	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope-----------	Slope, droughty.
LaB----------------- Lackawanna	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Rooting depth, percs slowly.	Rooting depth, percs slowly.
LaC, LaD, LaE----- Lackawanna	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
LnB---------------- Lansing	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly---	Favorable.
LnC, LnD----------- Lansing	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope.
LoB---------------- Lordstown	Moderate: seepage, depth to rock, slope.	Severe: piping, thin layer.	Severe: no water.	Deep to water	Depth to rock	Depth to rock.
LoC---------------- Lordstown	Severe: slope.	Severe: piping, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
LrE*, LrF*: Lordstown----------	Severe: slope.	Severe: piping, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Oquaga------------	Severe: slope.	Severe: seepage, piping, thin layer.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
MaB---------------- Mardin	Moderate: slope.	Moderate: piping.	Severe: no water.	Slope, percs slowly.	Wetness, rooting depth, percs slowly.	Wetness, rooting depth, percs slowly.
MaC, MaD----------- Mardin	Severe: slope.	Moderate: piping.	Severe: no water.	Slope, percs slowly.	Slope, wetness, rooting depth.	Slope, wetness, rooting depth.
MbE*: Mardin------------	Severe: slope.	Moderate: piping.	Severe: no water.	Slope, percs slowly.	Slope, large stones, wetness.	Slope, large stones, rooting depth.
Lackawanna--------	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, rooting depth.	Slope, wetness, rooting depth.
McB*: Mardin------------	Moderate: slope.	Moderate: piping.	Severe: no water.	Slope, percs slowly.	Large stones, wetness, rooting depth.	Large stones, rooting depth.
Wellsboro---------	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Large stones, rooting depth, wetness.	Large stones, rooting depth, wetness.
McC*: Mardin------------	Severe: slope.	Moderate: piping.	Severe: no water.	Slope, percs slowly.	Slope, large stones, wetness.	Slope, large stones, rooting depth.
Wellsboro---------	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, large stones, wetness.	Large stones, rooting depth, slope.
MoA---------------- Morris	Slight----------	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Percs slowly, wetness, rooting depth.	Wetness, rooting depth, percs slowly.
MoB---------------- Morris	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Percs slowly, wetness, rooting depth.	Wetness, rooting depth, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
MoC----------------- Morris	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Percs slowly, wetness, slope.	Wetness, rooting depth, slope.
OaB----------------- Oquaga	Moderate: seepage, depth to rock, slope.	Severe: seepage, piping, thin layer.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, droughty.
OaC----------------- Oquaga	Severe: slope.	Severe: seepage, piping, thin layer.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
OlB*:						
Oquaga------------	Moderate: seepage, depth to rock, slope.	Severe: seepage, piping, thin layer.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, droughty.
Lordstown---------	Moderate: seepage, depth to rock, slope.	Severe: piping, thin layer.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, depth to rock.
OlC*, OlE*:						
Oquaga------------	Severe: slope.	Severe: seepage, piping, thin layer.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Lordstown---------	Severe: slope.	Severe: piping, thin layer.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, depth to rock.
PhA----------------- Phelps	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, too sandy.	Favorable.
PhB----------------- Phelps	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Frost action, slope, cutbanks cave.	Wetness, too sandy.	Favorable.
Pt*, Pu*. Pits						
Ra------------------ Raynham	Slight----------	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Wetness, percs slowly, erodes easily.
Re------------------ Red Hook	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Frost action---	Wetness---------	Wetness.
RhB----------------- Riverhead	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Too sandy-------	Favorable.
RhC----------------- Riverhead	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope.
Sa*: Saprists.						
Aquents.						
ScA----------------- Scio	Moderate: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Cutbanks cave, frost action.	Erodes easily, wetness.	Erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
ScB: Scio	Moderate: seepage, slope.	Severe: piping, wetness.	Severe: cutbanks cave.	Slope, cutbanks cave, frost action.	Erodes easily, wetness.	Erodes easily.
Te: Teel	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding, frost action.	Erodes easily, wetness.	Erodes easily.
Th: Teel	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
Tr: Trestle	Severe: seepage.	Severe: seepage.	Moderate: deep to water.	Deep to water	Not needed	Droughty.
Tu: Tuller	Severe: depth to rock.	Severe: thin layer, wetness.	Severe: no water.	Percs slowly, depth to rock, frost action.	Depth to rock, wetness, percs slowly.	Wetness, depth to rock, percs slowly.
Ud*: Udifluvents.						
Fluvaquents.						
Ue*. Udorthents						
UnA: Unadilla	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
UnB: Unadilla	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
VaB: Valois	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable	Favorable.
VaC, VaD, VaE, VaF: Valois	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
VoA: Volusia	Slight	Severe: wetness.	Severe: no water.	Percs slowly, frost action.	Large stones	Large stones, wetness.
VoB: Volusia	Moderate: slope.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Large stones	Large stones, wetness.
VoC: Volusia	Severe: slope.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, large stones.	Large stones, wetness, slope.
VpB*: Volusia	Moderate: slope.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Large stones, wetness.	Large stones, wetness.
Morris	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Percs slowly, wetness, large stones.	Percs slowly, wetness, large stones.
Wa: Wayland	Slight	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, flooding, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
WeB: Wellsboro	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, rooting depth, percs slowly.	Rooting depth, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
WeC---------------- Wellsboro	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, rooting depth, slope.	Rooting depth, percs slowly, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Ad------- Alden	0-5	Silt loam--------	ML, OL	A-7, A-5	0	95-100	90-100	85-100	70-95	40-50	5-15
	5-40	Silt loam, silty clay loam, very fine sandy loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	70-90	20-35	5-15
	40-62	Gravelly loam, fine sandy loam, silty clay loam.	CL, GC, SC, CL-ML	A-2, A-4, A-6	0-5	60-95	50-90	45-90	30-85	20-35	5-15
ArB------- Arkport	0-9	Fine sandy loam	SM, ML	A-4	0	95-100	95-100	65-95	40-65	<15	NP-4
	9-65	Very fine sandy loam, loamy very fine sand, loamy fine sand.	SM, ML	A-2, A-4	0	95-100	95-100	70-95	30-65	<15	NP-4
AsB, AsC------- Arnot	0-6	Channery silt loam.	ML, GM, SM	A-2, A-4, A-5	5-10	60-85	55-80	45-80	30-70	35-45	1-9
	6-16	Very channery silt loam, very channery loam.	GM, GM-GC, SM, SM-SC	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	20-35	1-9
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
At------- Atherton	0-8	Silt loam--------	ML, OL, CL, CL-ML	A-4, A-7, A-5, A-6	0-5	95-100	90-100	75-95	55-85	25-50	5-20
	8-39	Silt loam, silty clay loam, gravelly loam.	GM-GC, CL, CL-ML, SC	A-4, A-6	0-5	65-95	60-95	50-90	40-80	25-40	5-20
	39-60	Stratified gravelly loam to silty clay loam.	GM, GM-GC, CL-ML, ML	A-1, A-2, A-4	0-5	50-80	45-75	25-70	20-60	5-15	NP-5
BaB, BaC, BaD---- Bath	0-11	Channery silt loam.	ML, GM, SM	A-2, A-4	5-15	55-80	50-75	40-75	30-70	30-40	5-10
	11-29	Channery loam, gravelly loam, silt loam.	SM, GM, ML	A-2, A-4, A-1	5-10	55-95	50-90	40-85	20-80	20-35	NP-7
	29-52	Channery loam, gravelly sandy loam, very channery silt loam.	GM, SM, GM-GC, ML	A-1, A-2, A-4	10-15	30-80	25-75	15-75	10-70	<25	NP-6
	52-60	Flaggy loam, channery silt loam, very channery sandy loam.	GM-GC, ML GM, SM	A-1, A-2, A-4	10-15	30-80	25-75	15-75	10-70	<25	NP-6
BvB*, BvC*, BvD*: Bath-------	0-11	Gravelly silt loam.	ML, GM, SM	A-2, A-4	5-15	55-80	50-75	40-75	30-70	30-40	5-10
	11-29	Channery loam, gravelly loam, silt loam.	SM, GM, ML	A-2, A-4, A-1	5-10	55-95	50-90	40-85	20-80	20-35	NP-7
	29-52	Channery loam, gravelly sandy loam, very channery silt loam.	GM, SM, GM-GC, ML	A-1, A-2, A-4	10-15	30-80	25-75	15-75	10-70	<25	NP-6
	52-60	Flaggy loam, channery silt loam, very channery sandy loam.	GM-GC, ML GM, SM	A-1, A-2, A-4	10-15	30-80	25-75	15-75	10-70	<25	NP-6

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BvB*, BvC*, BvD*: Valois----------	0-14	Gravelly silt loam.	ML, GM, SM, GM-GC	A-4, A-2, A-1	0-5	55-80	50-75	35-75	20-70	20-40	1-12
	14-40	Gravelly loam, gravelly silt loam, fine sandy loam.	GM, ML, SM, GM-GC	A-4, A-2, A-1	0-10	55-95	50-90	35-90	20-80	15-25	NP-5
	40-60	Very gravelly fine sandy loam, very gravelly loam, very gravelly sandy loam.	GM, GW-GM, GW, GM-GC	A-1, A-2, A-4	0-15	20-60	15-55	10-50	4-40	15-25	NP-7
Ca---------------- Canandaigua	0-7	Silt loam--------	ML, MH	A-4, A-5, A-7	0	95-100	95-100	90-100	85-100	35-55	5-15
	7-27	Silt loam, very fine sandy loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-95	20-40	5-15
	27-60	Silt loam, very fine sandy loam.	ML, CL, CL-ML	A-4	0	95-100	95-100	90-100	70-95	20-30	3-10
CbB, CbC--------- Canaseraga	0-8	Silt loam--------	ML	A-4	0-2	95-100	95-100	90-95	80-90	<20	NP-4
	8-29	Silt loam, very fine sandy loam.	CL-ML, ML	A-4	0-2	95-100	95-100	90-95	80-90	<20	NP-6
	29-54	Channery silt loam, channery loam, loam.	ML, CL, GC, GM	A-4, A-2	5-10	65-85	60-80	50-75	30-75	20-25	3-8
	54-60	Channery silt loam, channery loam, loam.	ML, CL, GC, GM	A-4, A-2	5-10	65-85	60-80	50-75	30-75	20-25	3-8
Cc---------------- Carlisle	0-99	Sapric material	Pt	A-8	---	---	---	---	---	---	---
CdA, CdB--------- Castile	0-8	Gravelly silt loam.	ML, GM, SM, CL-ML	A-2, A-4	0-5	55-85	50-75	40-75	30-65	<30	NP-10
	8-29	Very gravelly loam, very gravelly sandy loam, gravelly silt loam.	GM, SM, ML, GM-GC	A-1, A-2, A-4	5-10	40-75	35-70	15-65	5-60	<30	NP-10
	29-60	Very gravelly sand, very gravelly loam, very gravelly loamy sand.	GW, GP, GW-GM, SW-SM	A-1, A-2, A-4	5-10	30-85	25-70	10-45	0-40	---	NP
ChA, ChB, ChC, ChD, ChE-------- Chenango	0-9	Gravelly silt loam.	ML, SM, GM	A-2, A-4, A-1	5-15	55-85	55-80	35-80	15-70	<35	NP-10
	9-34	Gravelly silt loam, gravelly fine sandy loam, very gravelly silt loam.	ML, GM, SM	A-2, A-4, A-1	5-10	35-80	30-75	25-75	15-65	<40	NP-10
	34-62	Very gravelly loamy coarse sand, very gravelly sand, gravelly loamy fine sand.	GW, GM, SM, SP	A-1	5-10	25-65	20-60	10-50	1-20	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CkA, CkB---------- Chenango	0-8	Channery silt loam.	ML, GM, SM	A-2, A-4, A-1	5-15	55-85	55-80	35-80	15-70	<40	NP-10
	8-24	Channery silt loam, channery loam, very gravelly fine sandy loam.	ML, GM, SM, GP-GM	A-2, A-4, A-1	5-20	25-75	20-70	15-70	10-65	<40	NP-10
	24-60	Very channery silt loam, very channery loam, very channery coarse sandy loam.	GW-GM GP-GM	A-1, A-2 A-4	10-20	15-60	10-55	5-55	5-50	<35	NP-10
Cm*:											
Chippewa---------	0-5	Channery silt loam.	GM, ML, SM, OL	A-7, A-5	5-10	65-90	60-70	50-70	35-65	40-50	5-15
	5-15	Channery silt loam, loam, channery silty clay loam.	GM, ML, SM-SC, CL-ML	A-4	5-10	65-85	60-85	45-85	35-75	25-35	5-10
	15-60	Very channery silt loam, channery loam, channery silty clay loam.	CL, GC, SC, CL-ML	A-2, A-4	10-15	60-80	55-70	45-70	30-65	15-25	5-10
Norwich----------	0-9	Silt loam---------	ML, OL	A-7, A-5	0-5	80-100	75-95	65-90	55-85	40-50	5-15
	9-15	Channery silt loam, channery loam, loam.	GM, ML, CL-ML, GM-GC	A-4	0-15	65-95	65-90	60-85	40-80	25-35	5-10
	15-60	Channery silt loam, channery loam, very channery sandy loam.	CL, GC, CL-ML, SC	A-2, A-4	10-20	60-90	55-70	35-70	20-65	15-25	5-10
Cn*:											
Chippewa---------	0-5	Very stony silt loam.	GM, ML, SM	A-7, A-5	5-10	65-90	60-70	50-70	35-65	40-50	5-15
	5-15	Channery silt loam, loam, channery silty clay loam.	GM, ML, CL, GC	A-4	5-10	65-85	60-85	45-85	35-75	25-35	5-10
	15-60	Very channery silt loam, channery loam, channery silty clay loam.	CL, GC, SC, CL-ML	A-2, A-4	10-25	60-80	55-70	45-70	30-65	15-25	5-10
Norwich----------	0-9	Very stony silt loam.	GM, ML, OL, SM	A-7, A-5	10-20	70-90	65-85	60-80	40-75	40-50	5-15
	9-15	Channery silt loam, channery loam, loam.	GM, ML, SM, CL-ML	A-4	0-15	65-95	65-90	60-85	40-80	25-35	5-10
	15-60	Channery silt loam, channery loam, very channery sandy loam.	CL-ML, SM-SC, GC, SC	A-2, A-4	10-25	60-90	55-70	35-70	20-65	15-25	5-10

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
GrB, GrC---------- Greene	0-9	Silt loam--------	ML, CL, MH	A-6, A-7	0-10	80-100	75-95	65-95	60-80	40-55	10-20
	9-22	Channery silt loam, channery loam, silty clay loam.	ML, CL, SM, SC, MH	A-6, A-7	0-15	80-100	70-85	60-85	45-80	40-55	10-20
	22-34	Channery loam, channery silt loam, silty clay loam.	ML, CL-ML, SM, SC	A-6, A-7	0-15	80-100	70-85	60-85	45-80	20-30	1-7
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ha, Hb------------ Hamlin	0-9	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	60-90	15-35	2-15
	9-38	Silt loam, very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	60-90	15-35	2-15
	38-60	Silt loam, very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	60-90	15-35	2-15
HoA, HoB, HoC, HoD, HoE--------- Howard	0-10	Gravelly loam----	SM, GM, ML, GM-GC	A-4, A-2, A-1	0-5	55-80	50-75	30-70	15-65	25-35	5-10
	10-20	Gravelly loam, very gravelly sandy loam, gravelly silt loam.	SC, GC, GM-GC, CL-ML	A-4, A-2, A-1	0-5	45-80	40-75	25-70	10-60	15-25	5-10
	20-51	Very gravelly loam, very gravelly sandy clay loam, very gravelly sandy loam.	GC, GW-GC, GM-GC, GP-GC	A-2, A-4	5-10	40-55	35-50	20-45	10-40	25-30	5-10
	51-80	Stratified sand and gravel, very gravelly very coarse sandy loam.	GW, GP, GW-GM, GP-GM	A-1	5-15	35-45	30-40	15-30	0-5	<20	NP-5
HpA, HpB, HpC----- Howard	0-15	Silt loam--------	SM, ML, SM-SC, CL-ML	A-4, A-2	0	90-100	80-90	50-90	25-80	25-35	5-10
	15-20	Gravelly loam, very gravelly sandy loam, gravelly silt loam.	SC, GC, GM-GC, CL-ML	A-4, A-2, A-1	0-5	45-80	40-75	25-70	10-60	15-25	5-10
	20-51	Very gravelly loam, very gravelly sandy clay loam, very gravelly sandy loam.	GC, GW-GC, GM-GC, GP-GC	A-2, A-4	5-10	40-55	35-50	20-45	10-40	25-30	5-10
	51-80	Stratified sand and gravel.	GW, GP, GW-GM, GP-GM	A-1	5-15	35-45	30-40	15-30	0-5	<20	NP-5
LaB, LaC, LaD, LaE--------------- Lackawanna	0-5	Channery silt loam.	GM, ML, CL, SM	A-2, A-4	0-15	40-80	40-75	35-70	20-60	---	---
	5-33	Loam, silt loam, very channery silt loam.	GM, ML, CL, SM	A-2, A-4, A-6, A-1	0-20	40-80	40-75	35-70	20-60	20-35	1-14
	33-60	Silt loam, very channery silt loam, channery sandy loam.	GM, SM, ML, CL	A-2, A-4, A-6, A-1	0-20	50-85	40-80	35-75	20-55	15-35	1-12

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
LnB, LnC, LnD---- Lansing	0-9	Gravelly silt loam.	ML, GM, SM	A-4, A-2	0-5	60-80	55-75	45-75	30-70	25-45	1-15
	9-15	Gravelly silt loam, loam, very gravelly very fine sandy loam.	ML, GM, SM, CL-ML	A-4, A-1, A-2	0-5	50-100	45-95	40-95	20-85	20-35	1-10
	15-48	Silty clay loam, gravelly silt loam, very gravelly loam.	ML, CL, GC, SM-SC	A-4, A-2	0-5	50-100	45-95	40-90	25-90	20-30	2-10
	48-60	Gravelly silt loam, gravelly loam, very gravelly loam.	GM, GC, ML, CL	A-4, A-2, A-1	5-10	40-80	35-75	30-75	20-70	15-25	2-10
LoB, LoC--------- Lordstown	0-9	Channery silt loam.	ML, GM, SM	A-4	5-20	65-85	50-75	50-75	40-65	<30	NP-4
	9-20	Channery silt loam, channery loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	20-24	Very channery loam, channery silt loam, very channery fine sandy loam.	ML, GM, SM	A-2, A-4, A-1	5-25	40-75	30-70	25-70	15-60	<30	NP-4
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LrE*, LrF*:											
Lordstown-------	0-9	Channery silt loam.	ML, GM, SM	A-4	5-20	65-85	50-75	50-75	40-65	<30	NP-4
	9-20	Channery silt loam, channery loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	20-24	Very channery loam, channery silt loam, very channery fine sandy loam.	ML, GM, SM	A-2, A-4, A-1	5-25	40-75	30-70	25-70	15-60	<30	NP-4
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Oquaga----------	0-15	Channery silt loam.	ML, GM, SM	A-4, A-2, A-5	5-20	50-85	40-70	35-70	25-65	35-45	2-7
	15-26	Very channery loam, very channery silt loam.	GM, ML, SM, GM-GC	A-1, A-2, A-4	10-25	35-70	25-60	20-60	15-55	20-30	2-7
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
MaB, MaC, MaD---- Mardin	0-6	Channery silt loam.	GM, ML, CL, GC	A-4	5-20	65-75	60-70	50-70	35-60	25-35	5-10
	6-16	Channery silt loam, loam, gravelly loam.	CL, GC, CL-ML, SM-SC	A-4	5-10	60-90	55-90	45-90	35-80	15-25	5-10
	16-46	Channery loam, channery silt loam, very channery loam.	CL, GC, SC, CL-ML	A-2, A-4, A-1	10-25	40-80	35-75	30-70	20-65	20-30	5-10
	46-60	Channery loam, channery silt loam, very channery silt loam.	CL, GC, SC, CL-ML	A-2, A-4, A-1	10-25	40-80	35-75	30-70	20-65	20-30	5-10

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
MbE*: Mardin----------	0-6	Very stony silt loam.	GM, ML, CL, GC	A-4	5-10	65-75	60-70	50-70	35-60	25-35	5-10
	6-16	Channery silt loam, loam, gravelly loam.	CL, GC, SC, CL-ML	A-4	5-10	60-90	55-90	45-90	35-80	15-25	5-10
	16-46	Channery loam, channery silt loam, very channery loam.	CL, GC, SC, CL-ML	A-2, A-4, A-1	10-25	40-80	35-75	30-70	20-65	20-30	5-10
	46-60	Channery loam, channery silt loam, very channery silt loam.	CL, GC, SC, CL-ML	A-2, A-4, A-1	10-25	40-80	35-75	30-70	20-65	20-30	5-10
Lackawanna------	0-5	Very stony silt loam.	ML, CL, GM, SM	A-4, A-2	3-20	40-100	40-95	35-90	20-85	---	---
	5-33	Very channery loam, silt loam, flaggy loam.	GM, ML, CL, SM	A-2, A-4, A-6	0-20	40-80	40-75	35-70	20-60	20-35	1-14
	33-60	Channery loam, very channery silt loam, flaggy loam.	GM, SM, ML, CL	A-2, A-4, A-6	0-20	50-85	40-80	35-75	20-55	15-35	1-12
McB*, McC*: Mardin----------	0-6	Very stony silt loam.	GM, ML, CL, GC	A-4	5-10	65-75	60-70	50-70	35-60	25-35	5-10
	6-16	Channery silt loam, loam, gravelly loam.	CL, GC, SC, CL-ML	A-4	5-10	60-90	55-90	45-90	35-80	15-25	5-10
	16-46	Channery loam, channery silt loam, very channery loam.	CL, GC, SC, CL-ML	A-2, A-4, A-1	10-25	40-80	35-75	30-70	20-65	20-30	5-10
	46-60	Channery loam, channery silt loam, very channery silt loam.	CL, GC, SC, CL-ML	A-2, A-4, A-1	10-25	40-80	35-75	30-70	20-65	20-30	5-10
Wellsboro-------	0-8	Very stony silt loam.	ML, CL, SM	A-4, A-2	3-10	70-100	65-100	60-95	30-90	---	---
	8-18	Loam, channery silt loam, gravelly loam.	ML, SM, CL-ML, GM-GC	A-2, A-4	0-15	70-100	60-100	55-95	30-70	15-30	NP-10
	18-66	Loam, channery silt loam, channery loam.	GM, ML, CL, SM	A-2, A-4	0-20	55-90	45-90	35-80	25-60	15-30	NP-10
MoA, MoB, MoC---- Morris	0-15	Channery silt loam.	GM, ML, CL, SM	A-4, A-2	0-15	60-95	50-75	40-75	30-65	20-30	1-10
	15-63	Channery silt loam, channery loam, channery silty clay loam.	GM, SM, CL, SM	A-2, A-4	0-20	60-95	45-80	40-80	25-75	15-25	NP-9
OaB, OaC--------- Oquaga	0-15	Channery silt loam.	ML, GM, SM	A-4, A-2, A-5	5-20	50-85	40-70	35-70	25-65	35-45	2-7
	15-29	Very channery loam, very channery silt loam.	GM, ML, SM, GM-GC	A-1, A-2, A-4	10-25	35-70	25-60	20-60	15-55	20-30	2-7
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
OlB*, OlC*, OlE*:											
Oquaga----------	0-15	Very stony silt loam.	ML, GM, SM	A-4, A-2, A-5	10-20	50-85	40-70	35-70	25-65	35-45	2-7
	15-29	Very channery silt loam, very channery loam.	GM, ML, SM, GM-GC	A-1, A-2, A-4	10-25	35-70	25-60	20-60	15-55	20-30	2-7
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lordstown-------	0-9	Very stony silt loam.	ML, GM, SM	A-4	10-20	65-85	50-75	50-75	40-65	<30	NP-4
	9-20	Channery silt loam, channery loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	20-24	Very channery loam, channery silt loam, very channery fine sandy loam.	ML, GM, SM	A-2, A-4, A-1	5-25	40-75	30-70	25-70	15-60	<30	NP-4
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
PhA, PhB--------- Phelps	0-9	Gravelly silt loam.	ML, SM, GM, CL-ML	A-2, A-4, A-1	0-25	50-80	45-75	25-75	15-70	20-35	2-10
	9-15	Gravelly loam, gravelly clay loam, silt loam.	ML, SM, GM, CL-ML	A-2, A-4	0-25	50-95	45-90	35-90	25-70	20-35	2-10
	15-32	Gravelly clay loam, clay loam, gravelly silt loam.	ML, SM, GM, CL-ML	A-2, A-4	0-25	50-95	45-90	35-90	25-70	20-35	2-10
	32-60	Stratified very gravelly sand to loamy sand.	GW, GP, GM, GW-GM	A-1	5-30	15-55	10-50	5-40	0-15	<20	NP-2
Pt*, Pu*. Pits											
Ra--------------- Raynham	0-7	Silt loam--------	ML	A-4	0	100	95-100	80-100	55-95	<25	NP-10
	7-37	Silt loam, silt, very fine sandy loam.	ML, CL-ML	A-4	0	100	95-100	80-100	55-95	<30	NP-10
	37-60	Silt loam, silt, sandy loam, loam.	ML, SM, SM-SC	A-4, A-1	0	100	95-100	50-100	15-95	<25	NP-10
Re--------------- Red Hook	0-9	Silt loam--------	ML, SM, SM-SC, CL-ML	A-4, A-2	0-5	80-100	75-95	50-95	30-80	15-40	1-15
	9-27	Silt loam, loam, very gravelly sandy loam.	ML, SM, GM, SM-SC	A-1, A-2, A-4	0-5	30-90	25-85	15-80	10-70	15-30	1-15
	27-60	Gravelly loam, gravelly silt loam, very gravelly sandy loam.	GM, SM, SM-SC, ML	A-1, A-2, A-4	5-10	30-80	25-75	15-75	10-70	15-30	1-15
RhB, RhC--------- Riverhead	0-8	Fine sandy loam	SM, ML	A-2, A-4	0-5	95-100	90-100	55-95	30-75	14-18	1-3
	8-28	Sandy loam, fine sandy loam, gravelly sandy loam.	SM, GM	A-2, A-4, A-1	0-5	65-100	60-95	40-80	20-45	14-18	1-3
	28-60	Stratified sand and gravel.	SP, SW, SP-SM	A-1	0-5	60-95	55-90	25-50	0-10	---	NP
Sa*: Saprists.											
Aquents.											

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
ScA, ScB: Scio	0-7	Silt loam	ML	A-4	0	100	95-100	90-100	70-95	<35	NP-4
	7-51	Silt loam, very fine sandy loam.	ML	A-4	0	100	95-100	90-100	70-95	<30	NP-4
	51-66	Stratified very gravelly sand to silt loam.	ML, SM, SP, GP-GM	A-4, A-2, A-1, A-3	0	35-100	30-100	15-100	2-80	<20	NP-4
Te, Th: Teel	0-10	Silt loam	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	70-90	15-35	2-15
	10-40	Silt loam, very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	65-90	15-35	2-15
	40-65	Silt loam, fine sandy loam, gravelly very fine sandy loam.	ML, SM, CL, SM-SC	A-4, A-6, A-2	0-5	75-100	70-100	50-100	30-90	<35	NP-15
Tr: Trestle	0-10	Silt loam	ML, CL-ML, CL	A-4	0-2	80-95	75-90	65-85	50-80	25-40	2-10
	10-23	Gravelly silt loam, gravelly loam, very gravelly sandy loam.	ML, CL, SM, GM	A-2, A-4	0-5	45-80	40-75	25-70	15-55	25-40	2-10
	23-60	Very gravelly coarse sandy loam, very gravelly loam, very channery silt loam.	SM, GM, GW-GM, SW-SM	A-1, A-2	5-10	20-50	15-45	10-40	5-30	<20	NP-10
Tu: Tuller	0-8	Channery silt loam.	ML, GM, SM, MH	A-2, A-4, A-7	5-10	55-75	50-70	40-70	30-60	40-55	10-20
	8-17	Channery silt loam, channery loam.	GM, GM-GC	A-2, A-4, A-1	10-20	55-70	50-65	30-50	20-40	20-30	2-7
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ud*: Udifluvents.											
Fluvaquents.											
Ue*. Udorthents											
UnA, UnB: Unadilla	0-11	Silt loam	ML	A-4	0	100	95-100	90-100	70-90	<35	NP-10
	11-46	Silt loam, very fine sandy loam.	ML, CL-ML	A-4	0	100	95-100	90-100	70-90	<25	NP-10
	46-60	Very gravelly sand, gravelly sand, sandy loam.	GM, GP, SM, SP	A-2, A-1, A-3	0-10	35-100	25-95	10-70	1-40	---	NP
VaB, VaC, VaD, VaE, VaF: Valois	0-14	Gravelly silt loam.	ML, GM, SM, GM-GC	A-4, A-2, A-1	0-5	55-80	50-75	35-75	20-70	20-40	1-12
	14-40	Gravelly loam, gravelly silt loam, fine sandy loam.	GM, ML, SM, GM-GC	A-4, A-2, A-1	0-10	55-95	50-90	35-90	20-80	15-25	NP-5
	40-60	Very gravelly fine sandy loam, very gravelly loam, very gravelly sandy loam.	GM, GW-GM, GW, GM-GC	A-1, A-2, A-4	0-15	20-60	15-55	10-50	4-40	15-25	NP-7

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
VoA, VoB, VoC---- Volusia	0-10	Channery silt loam.	GM, ML, SM CL-ML	A-4, A-5	5-10	70-85	65-80	55-80	40-70	15-25	5-10
	10-15	Channery silt loam, channery loam, silt loam.	CL-ML, CL, GM-GC, SC	A-4	5-10	65-90	60-85	50-85	35-75	15-25	5-10
	15-48	Channery silt loam, channery loam, silty clay loam.	SM-SC, CL, SC, CL-ML	A-4	10-25	75-90	70-85	60-85	40-80	20-30	5-10
	48-60	Very channery loam, channery loam, silt loam.	GM-GC, SC, CL, CL-ML	A-2, A-4, A-1	10-25	40-90	35-85	30-85	20-75	20-30	5-10
VpB*: Volusia---------	0-10	Very stony silt loam.	GM, ML, SM CL-ML	A-4, A-5	5-10	65-85	60-80	50-80	35-70	15-25	5-10
	10-15	Channery silt loam, channery loam, silt loam.	CL-ML, CL, GM-GC, SC	A-4	5-10	65-90	60-85	50-85	35-75	15-25	5-10
	15-48	Channery silt loam, channery loam, silty clay loam.	SM-SC, CL-ML, CL, SC	A-4	10-25	75-90	70-85	60-85	40-80	20-30	5-10
	48-60	Very channery loam, channery loam, silt loam.	GM-GC, CL-ML, CL, SC	A-4, A-2, A-1	10-25	40-90	35-85	30-85	20-75	20-30	5-10
Morris----------	0-15	Very stony silt loam.	GM, ML, CL, SM	A-4, A-2	3-20	60-95	55-85	40-80	30-70	20-30	1-10
	15-63	Channery loam, channery silt loam, channery silty clay loam.	GM, ML, CL, SM	A-2, A-4	0-20	60-95	45-80	40-80	25-75	15-25	NP-9
Wa--------------- Wayland	0-9	Silt loam--------	ML, OL	A-7, A-6 A-5	0	100	95-100	90-100	70-95	40-50	5-15
	9-47	Silt loam, silty clay loam.	ML, CL-ML, CL	A-6, A-4, A-7	0	100	95-100	90-100	70-95	25-45	5-15
	47-60	Stratified silty clay loam to gravelly fine sandy loam.	CL, CL-ML, SC, GC	A-2, A-4	0	65-100	55-100	50-100	25-90	15-25	5-10
WeB, WeC--------- Wellsboro	0-8	Channery silt loam.	ML, CL, SM	A-2, A-4	0-15	70-90	65-85	60-80	30-60	---	---
	8-18	Loam, channery silt loam, gravelly loam.	ML, SM, CL-ML, GM-GC	A-2, A-4	0-15	70-100	60-100	55-95	30-70	15-30	NP-10
	18-66	Loam, channery sandy loam, very gravelly silt loam.	SM, GM, ML, CL	A-2, A-4	0-20	55-90	45-90	35-80	25-60	15-30	NP-10

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
Ad----------------- Alden	0-5 5-40 40-62	15-27 18-35 18-35	1.10-1.40 1.20-1.50 1.50-1.80	0.6-2.0 0.2-0.6 0.06-0.6	0.16-0.22 0.14-0.20 0.08-0.15	5.1-7.3 5.6-7.3 6.1-8.4	Low----------- Low----------- Low-----------	0.37 0.37 0.28	5	4-10
ArB---------------- Arkport	0-9 9-65	5-18 3-15	1.10-1.40 1.25-1.55	2.0-6.0 2.0-6.0	0.09-0.17 0.06-0.16	4.5-7.3 4.5-8.4	Low----------- Low-----------	0.28 0.28	3	1-3
AsB, AsC----------- Arnot	0-6 6-16 16	8-18 8-18 ---	1.10-1.40 1.20-1.50 ---	0.6-2.0 0.6-2.0 ---	0.10-0.15 0.08-0.12 ---	3.6-6.0 3.6-6.0 ---	Low----------- Low----------- -------------	0.24 0.17 ----	2	3-6
At----------------- Atherton	0-8 8-39 39-60	15-35 18-35 15-35	1.10-1.40 1.25-1.55 1.45-1.65	0.6-2.0 0.6-2.0 0.6-6.0	0.16-0.21 0.10-0.19 0.05-0.12	5.1-7.3 5.6-7.8 5.6-7.8	Low----------- Low----------- Low-----------	0.37 0.28 0.28	5	4-10
BaB, BaC, BaD----- Bath	0-11 11-29 29-52 52-60	5-18 5-18 5-18 3-18	1.10-1.40 1.20-1.50 1.70-2.00 1.65-1.95	0.6-2.0 0.6-2.0 <0.2 <0.2	0.10-0.20 0.08-0.18 0.01-0.06 0.01-0.06	4.5-6.0 4.5-6.0 4.5-6.5 5.1-8.4	Low----------- Low----------- Low----------- Low-----------	0.24 0.24 0.24 0.24	3	3-6
BvB*, BvC*, BvD*: Bath--------------	0-11 11-29 29-52 52-60	5-18 5-18 5-18 3-18	1.10-1.40 1.20-1.50 1.70-2.00 1.65-1.95	0.6-2.0 0.6-2.0 <0.2 <0.2	0.10-0.20 0.08-0.18 0.01-0.06 0.01-0.06	4.5-6.0 4.5-6.0 4.5-6.5 5.1-8.4	Low----------- Low----------- Low----------- Low-----------	0.24 0.24 0.24 0.24	3	3-6
Valois------------	0-14 14-40 40-60	6-18 6-18 6-18	1.10-1.40 1.20-1.50 1.60-1.80	0.6-2.0 0.6-2.0 0.6-6.0	0.08-0.16 0.07-0.14 0.03-0.09	4.5-6.0 4.5-6.0 5.6-7.3	Low----------- Low----------- Low-----------	0.24 0.32 0.24	3	2-6
Ca----------------- Canandaigua	0-7 7-27 27-60	18-35 18-35 18-35	1.00-1.25 1.20-1.40 1.15-1.40	0.6-2.0 0.2-0.6 0.2-0.6	0.20-0.35 0.19-0.20 0.19-0.20	5.6-7.8 6.1-7.8 6.6-8.4	Low----------- Low----------- Low-----------	0.49 0.49 0.64	5	4-15
CbB, CbC----------- Canaseraga	0-8 8-29 29-54 54-60	10-18 10-18 10-27 10-27	1.10-1.40 1.20-1.50 1.70-2.00 1.65-1.95	0.6-2.0 0.6-2.0 <0.2 <0.2	0.17-0.21 0.16-0.20 0.02-0.04 0.02-0.04	4.5-6.0 4.5-6.0 5.1-7.3 5.6-8.4	Low----------- Low----------- Low----------- Low-----------	0.49 0.64 0.28 0.28	3	2-4
Cc----------------- Carlisle	0-99	---	0.13-0.23	0.2-6.0	0.35-0.45	4.5-7.3	-------------	----	---	>70
CdA, CdB----------- Castile	0-8 8-29 29-60	6-18 4-15 2-10	1.10-1.40 1.25-1.55 1.45-1.65	0.6-6.0 2.0-6.0 >6.0	0.09-0.16 0.05-0.13 0.01-0.02	4.5-6.5 4.5-6.0 5.1-7.3	Low----------- Low----------- Low-----------	0.24 0.17 0.17	3	4-10
ChA, ChB, ChC, ChD, ChE--------- Chenango	0-9 9-34 34-62	6-18 6-18 1-8	1.20-1.50 1.25-1.55 1.45-1.65	0.6-6.0 0.6-6.0 6.0-20	0.08-0.15 0.05-0.14 0.01-0.03	4.5-5.5 4.5-6.0 5.1-7.8	Low----------- Low----------- Low-----------	0.24 0.17 0.17	3	2-6
CkA, CkB----------- Chenango	0-8 8-24 24-60	6-18 6-18 1-8	1.20-1.50 1.25-1.55 1.45-1.65	0.6-6.0 0.6-6.0 6.0-20	0.08-0.15 0.05-0.14 0.01-0.03	4.5-5.5 4.5-6.0 5.1-7.8	Low----------- Low----------- Low-----------	0.24 0.17 0.17	3	2-6
Cm*: Chippewa----------	0-5 5-15 15-60	10-27 18-35 10-35	1.10-1.40 1.20-1.50 1.70-2.00	0.6-2.0 0.6-2.0 <0.2	0.11-0.18 0.10-0.17 0.01-0.02	4.5-6.5 4.5-6.5 5.1-7.3	Low----------- Low----------- Low-----------	0.24 0.32 0.24	3	3-10
Norwich-----------	0-9 9-15 15-60	10-27 18-27 10-27	1.10-1.40 1.20-1.50 1.70-2.00	0.6-2.0 0.6-2.0 <0.2	0.14-0.20 0.11-0.18 0.02-0.04	5.1-6.5 5.1-6.5 5.1-7.3	Low----------- Low----------- Low-----------	0.32 0.24 0.24	3	3-10

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
Cn*:										
Chippewa	0-5	10-27	1.10-1.40	0.6-2.0	0.11-0.18	4.5-6.5	Low	0.24	3	3-10
	5-15	18-35	1.20-1.50	0.6-2.0	0.10-0.17	4.5-6.5	Low	0.32		
	15-60	10-35	1.70-2.00	<0.2	0.01-0.02	5.1-7.3	Low	0.24		
Norwich	0-9	10-27	1.10-1.40	0.6-2.0	0.12-0.18	5.1-6.5	Low	0.24	3	3-10
	9-15	18-27	1.20-1.50	0.6-2.0	0.11-0.18	5.1-6.5	Low	0.24		
	15-60	10-27	1.70-2.00	<0.2	0.02-0.04	5.1-7.3	Low	0.24		
GrB, GrC Greene	0-9	18-35	1.00-1.30	0.6-2.0	0.13-0.19	4.5-5.5	Low	0.24	2	3-9
	9-22	18-35	1.30-1.60	0.06-0.6	0.12-0.17	4.5-6.0	Low	0.17		
	22-34	18-35	1.30-1.60	0.06-0.6	0.12-0.17	5.1-6.0	Low	0.17		
	34	---	---	---	---	---	---	---		
Ha, Hb Hamlin	0-9	8-18	1.15-1.40	0.6-2.0	0.18-0.21	5.1-7.3	Low	0.49	5	2-6
	9-38	5-18	1.15-1.45	0.6-2.0	0.17-0.19	5.1-7.3	Low	0.49		
	38-60	5-18	1.15-1.45	0.6-2.0	0.17-0.19	5.1-6.0	Low	0.49		
HoA, HoB, HoC, HoD, HoE Howard	0-10	5-18	1.10-1.40	0.6-6.0	0.07-0.15	5.1-7.3	Low	0.24	3	2-6
	10-20	5-18	1.25-1.55	0.6-6.0	0.06-0.12	5.1-7.3	Low	0.17		
	20-51	10-25	1.25-1.55	0.6-6.0	0.05-0.08	5.1-7.3	Low	0.17		
	51-80	5-15	1.45-1.65	>20	0.01-0.02	6.6-8.4	Low	0.17		
HpA, HpB, HpC Howard	0-15	5-18	1.10-1.40	0.6-2.0	0.12-0.20	5.1-7.3	Low	0.32	3	2-6
	15-20	5-18	1.25-1.55	0.6-6.0	0.06-0.12	5.1-7.3	Low	0.17		
	20-51	10-25	1.25-1.55	0.6-6.0	0.05-0.08	5.1-7.3	Low	0.17		
	51-80	5-15	1.45-1.65	>20	0.01-0.02	6.6-8.4	Low	0.17		
LaB, LaC, LaD, LaE Lackawanna	0-5	10-27	1.20-1.40	0.6-2.0	0.10-0.14	4.5-5.5	Low	0.28	3	1-3
	5-33	5-18	1.40-1.60	0.6-2.0	0.10-0.14	4.5-5.5	Low	0.20		
	33-60	5-18	1.60-1.80	0.06-0.2	0.06-0.12	4.5-6.0	Low	0.20		
LnB, LnC, LnD Lansing	0-9	10-25	1.20-1.50	0.6-2.0	0.10-0.16	5.1-7.3	Low	0.24	3	3-6
	9-15	10-25	1.35-1.65	0.6-2.0	0.09-0.19	5.1-7.3	Low	0.32		
	15-48	18-28	1.35-1.65	0.6-2.0	0.08-0.16	5.1-7.3	Low	0.32		
	48-60	10-25	1.55-1.85	0.06-0.2	0.06-0.15	6.6-8.4	Low	0.24		
LoB, LoC Lordstown	0-9	8-18	1.10-1.40	0.6-2.0	0.11-0.17	4.5-6.5	Low	0.20	3	2-6
	9-20	8-18	1.20-1.50	0.6-2.0	0.10-0.16	4.5-6.0	Low	0.28		
	20-24	5-18	1.20-1.50	0.6-2.0	0.05-0.14	5.1-6.0	Low	0.28		
	24	---	---	---	---	---	---	---		
LrE*, LrF*:										
Lordstown	0-9	8-18	1.10-1.40	0.6-2.0	0.11-0.17	4.5-6.5	Low	0.20	3	2-6
	9-20	8-18	1.20-1.50	0.6-2.0	0.10-0.16	4.5-6.0	Low	0.28		
	20-24	5-18	1.20-1.50	0.6-2.0	0.05-0.14	5.1-6.0	Low	0.28		
	24	---	---	---	---	---	---	---		
Oquaga	0-7	7-27	1.10-1.40	0.6-2.0	0.08-0.17	3.6-6.0	Low	0.28	3	2-6
	7-26	7-27	1.20-1.50	0.6-2.0	0.04-0.12	3.6-6.0	Low	0.20		
	26	---	---	---	---	---	---	---		
MaB, MaC, MaD Mardin	0-6	10-18	1.10-1.40	0.6-2.0	0.11-0.17	3.6-6.5	Low	0.24	3	3-7
	6-16	10-18	1.20-1.50	0.6-2.0	0.09-0.16	3.6-6.5	Low	0.24		
	16-46	10-18	1.70-2.00	<0.2	0.01-0.03	4.5-7.3	Low	0.24		
	46-60	10-18	1.65-1.95	<0.2	0.01-0.03	5.1-8.4	Low	0.24		
MbE*:										
Mardin	0-6	10-18	1.10-1.40	0.6-2.0	0.11-0.17	3.6-6.5	Low	0.24	3	3-7
	6-16	10-18	1.20-1.50	0.6-2.0	0.09-0.16	3.6-6.5	Low	0.24		
	16-46	10-18	1.70-2.00	<0.2	0.01-0.03	4.5-7.3	Low	0.24		
	46-60	10-18	1.65-1.95	<0.2	0.01-0.03	5.1-8.4	Low	0.24		
Lackawanna	0-5	10-27	1.20-1.40	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.24	3	2-4
	5-33	5-18	1.40-1.60	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.20		
	33-60	5-18	1.60-1.80	0.06-0.2	0.06-0.12	4.5-6.0	Low	0.20		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
McB*, McC*:										
Mardin----------	0-6	10-18	1.1-1.40	0.6-2.0	0.11-0.17	3.6-6.5	Low-----------	0.24	3	3-7
	6-16	10-18	1.20-1.50	0.6-2.0	0.09-0.16	3.6-6.5	Low-----------	0.24		
	16-46	10-18	1.70-2.00	<0.2	0.01-0.03	4.5-7.3	Low-----------	0.24		
	46-60	10-18	1.65-1.95	<0.2	0.01-0.03	5.1-8.4	Low-----------	0.24		
Wellsboro-------	0-8	15-25	1.20-1.40	0.6-2.0	0.10-0.16	4.5-6.0	Low-----------	0.24	3	2-6
	8-18	15-27	1.30-1.50	0.6-2.0	0.10-0.14	4.5-6.0	Low-----------	0.28		
	18-66	15-27	1.30-1.60	0.06-0.2	0.06-0.10	4.5-6.0	Low-----------	0.28		
MoA, MoB, MoC---- Morris	0-15	15-25	1.20-1.40	0.6-2.0	0.10-0.14	4.5-6.0	Low-----------	0.28	4	1-3
	15-63	15-32	1.30-1.70	<0.2	0.06-0.08	4.5-6.5	Low-----------	0.24		
OaB, OaC--------- Oquaga	0-7	7-27	1.10-1.40	0.6-2.0	0.08-0.17	3.6-6.0	Low-----------	0.28	3	2-6
	7-29	7-27	1.20-1.50	0.6-2.0	0.04-0.12	3.6-6.0	Low-----------	0.20		
	29	---	---	---	---	---	-------------	----		
OlB*, OlC*, OlE*:										
Oquaga----------	0-7	7-27	1.10-1.40	0.6-2.0	0.08-0.17	3.6-6.0	Low-----------	0.20	3	2-6
	7-29	7-27	1.20-1.50	0.6-2.0	0.04-0.12	3.6-6.0	Low-----------	0.20		
	29	---	---	---	---	---	-------------	----		
Lordstown-------	0-9	8-18	1.10-1.40	0.6-2.0	0.11-0.17	4.5-6.5	Low-----------	0.20	3	2-6
	9-20	5-26	1.20-1.50	0.6-2.0	0.10-0.16	4.5-6.0	Low-----------	0.28		
	20-24	5-18	1.20-1.50	0.6-2.0	0.05-0.14	5.1-6.0	Low-----------	0.28		
	24	---	---	---	---	---	-------------	----		
PhA, PhB--------- Phelps	0-9	10-28	1.10-1.40	0.6-2.0	0.10-0.16	5.6-7.3	Low-----------	0.24	3	3-6
	9-15	18-35	1.25-1.55	0.6-2.0	0.08-0.13	5.6-7.3	Low-----------	0.24		
	15-32	18-35	1.25-1.55	0.6-2.0	0.09-0.18	5.6-7.3	Low-----------	0.24		
	32-60	1-5	1.45-1.65	2.0-20	0.01-0.04	7.4-8.4	Low-----------	0.17		
Pt*, Pu*. Pits										
Ra--------------- Raynham	0-7	3-16	1.20-1.50	0.6-2.0	0.20-0.30	4.5-5.5	Low-----------	0.49	5	3-10
	7-37	3-16	1.20-1.50	0.2-2.0	0.18-0.26	4.5-5.5	Low-----------	0.64		
	37-60	3-16	1.20-1.50	0.06-2.0	0.18-0.22	4.5-5.5	Low-----------	0.64		
Re--------------- Red Hook	0-9	8-18	1.10-1.40	0.6-2.0	0.14-0.19	5.1-6.5	Low-----------	0.32	3	3-12
	9-27	5-18	1.25-1.55	0.6-2.0	0.04-0.17	5.6-7.3	Low-----------	0.24		
	27-60	5-18	1.45-1.65	0.2-2.0	0.04-0.11	5.6-7.8	Low-----------	0.17		
RhB, RhC--------- Riverhead	0-8	3-10	1.10-1.40	2.0-6.0	0.14-0.20	3.6-6.0	Low-----------	0.28	3	2-4
	8-28	1-8	1.25-1.55	2.0-6.0	0.09-0.13	3.6-6.0	Low-----------	0.28		
	28-60	1-8	1.45-1.65	>20	0.02-0.04	4.5-7.3	Low-----------	0.17		
Sa*: Saprists.										
Aquents.										
ScA, ScB--------- Scio	0-7	2-15	1.20-1.50	0.6-2.0	0.18-0.21	4.5-6.0	Low-----------	0.49	3	2-8
	7-51	2-15	1.20-1.50	0.6-2.0	0.17-0.20	4.5-6.0	Low-----------	0.64		
	51-66	0-5	1.45-1.65	2.0-20	0.02-0.19	4.5-7.8	Low-----------	0.17		
Te--------------- Teel	0-10	8-18	1.15-1.40	0.6-2.0	0.18-0.21	5.1-7.3	Low-----------	0.49	5	2-6
	10-40	5-18	1.15-1.45	0.6-2.0	0.17-0.19	5.1-7.8	Low-----------	0.49		
	40-65	3-10	1.25-1.55	0.6-2.0	0.12-0.12	5.6-7.8	Low-----------	0.49		
Th--------------- Teel	0-10	8-18	1.15-1.40	0.6-2.0	0.18-0.21	5.1-7.3	Low-----------	0.49	5	2-6
	10-40	5-18	1.15-1.45	0.6-2.0	0.17-0.19	5.1-7.8	Low-----------	0.49		
	40-65	3-18	1.25-1.55	0.6-2.0	0.12-0.19	5.6-7.8	Low-----------	0.49		
Tr--------------- Trestle	0-10	15-20	1.35-1.45	0.6-2.0	0.15-0.21	5.1-6.0	Low-----------	0.3	3	4-7
	10-23	12-20	1.45-1.55	0.6-6.0	0.06-0.15	5.6-6.5	Low-----------	0.2		
	23-60	10-20	1.45-1.55	6.0-20	0.02-0.09	5.6-6.5	Low-----------	0.1		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
Tu	0-8	10-27	1.10-1.40	0.6-2.0	0.09-0.15	3.6-6.0	Low	0.24	2	4-9
Tuller	8-17	10-27	1.20-1.50	0.06-0.6	0.06-0.10	4.5-5.0	Low	0.17		
	17	---	---	---	---	---	-------------	----		
Ud*:										
Udifluvents.										
Fluvaquents.										
Ue*.										
Udorthents										
UnA, UnB	0-11	2-18	1.20-1.50	0.6-2.0	0.18-0.21	4.5-6.5	Low	0.49	3	2-7
Unadilla	11-46	1-18	1.20-1.50	0.6-2.0	0.17-0.20	4.5-6.5	Low	0.64		
	46-60	1-3	1.45-1.65	2.0-20	0.01-0.07	5.1-7.8	Low	0.17		
VaB, VaC, VaD, VaE, VaF	0-14	6-18	1.10-1.40	0.6-2.0	0.08-0.16	4.5-6.0	Low	0.24	3	2-6
Valois	14-40	6-18	1.20-1.50	0.6-2.0	0.07-0.14	4.5-6.0	Low	0.32		
	40-60	6-18	1.60-1.80	0.6-6.0	0.03-0.09	5.6-7.3	Low	0.24		
VoA, VoB, VoC	0-10	18-27	1.10-1.40	0.6-2.0	0.11-0.17	4.5-6.5	Low	0.24	3	2-7
Volusia	10-15	18-27	1.30-1.60	0.6-2.0	0.09-0.16	4.5-6.5	Low	0.24		
	15-48	15-35	1.70-2.00	<0.2	0.01-0.02	5.1-7.3	Low	0.24		
	48-60	15-27	1.65-1.95	<0.2	0.01-0.02	5.6-8.4	Low	0.24		
VpB*:										
Volusia	0-10	18-27	1.10-1.40	0.6-2.0	0.11-0.17	4.5-6.5	Low	0.24	3	---
	10-15	18-27	1.30-1.60	0.6-2.0	0.09-0.16	4.5-6.5	Low	0.24		
	15-48	15-35	1.70-2.00	<0.2	0.01-0.02	5.1-7.3	Low	0.24		
	48-60	15-27	1.65-1.95	<0.2	0.01-0.02	5.6-8.4	Low	0.24		
Morris	0-15	15-25	1.20-1.40	0.6-2.0	0.12-0.16	4.5-6.0	Low	0.24	4	---
	15-63	15-32	1.30-1.70	<0.2	0.06-0.08	4.5-6.5	Low	0.24		
Wa	0-9	15-35	1.05-1.40	0.2-2.0	0.17-0.22	5.1-7.0	Low	0.43	5	4-8
Wayland	9-47	18-35	1.10-1.60	0.06-0.2	0.16-0.20	5.1-7.3	Low	0.43		
	47-60	15-25	1.25-1.55	0.06-0.2	0.08-0.19	5.6-7.3	Low	0.43		
WeB, WeC	0-8	15-25	1.20-1.40	0.6-2.0	0.10-0.14	4.5-6.0	Low	0.28	3	1-3
Wellsboro	8-18	15-27	1.30-1.50	0.6-2.0	0.10-0.14	4.5-6.0	Low	0.28		
	18-66	15-27	1.30-1.60	0.06-0.2	0.06-0.10	4.5-6.0	Low	0.28		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Ad------------------ Alden	D	None---------	---	---	0-0.5	Apparent	Nov-Jun	>60	---	High------	High------	Low.
ArB----------------- Arkport	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low-------	Moderate.
AsB, AsC------------ Arnot	C/D	None---------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low-------	High.
At------------------ Atherton	B/D	None---------	---	---	0-0.5	Apparent	Nov-Jun	>60	---	High------	High------	Low.
BaB, BaC, BaD------- Bath	C	None---------	---	---	2.0-2.5	Perched	Nov-Mar	>60	---	Moderate	Moderate	Moderate.
BvB*, BvC*, BvD*:												
Bath----------------	C	None---------	---	---	2.0-2.5	Perched	Nov-Mar	>60	---	Moderate	Moderate	Moderate.
Valois--------------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low-------	High.
Ca------------------ Canandaigua	D	None---------	---	---	+1-1.0	Apparent	Nov-May	>60	---	High------	High------	Low.
CbB, CbC------------ Canaseraga	C	None---------	---	---	1.5-4.0	Perched	Mar-May	>60	---	High------	Moderate	Moderate.
Cc------------------ Carlisle	A/D	Frequent----	Long-------	Nov-May	+.5-1.0	Apparent	Sep-Jun	>60	---	High------	High------	Low.
CdA, CdB------------ Castile	B	None---------	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High------	Moderate	Moderate.
ChA, ChB, ChC, ChD, ChE----------- Chenango	A	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low-------	Moderate.
CkA, CkB------------ Chenango	A	Rare---------	---	---	3.0-6.0	Apparent	Apr-May	>60	---	Moderate	Low-------	Moderate.
Cm*, Cn*:												
Chippewa------------	D	None---------	---	---	0-0.5	Apparent	Nov-May	>60	---	High------	High------	Moderate.
Norwich-------------	D	None---------	---	---	0-0.5	Apparent	Nov-May	>60	---	High------	High------	Moderate.
GrB, GrC------------ Greene	B	None---------	---	---	0.5-1.0	Perched	Dec-Jun	20-40	Hard	High------	High------	High.
Ha------------------ Hamlin	B	Occasional	Brief------	Nov-May	3.0-6.0	Apparent	Nov-May	>60	---	High------	Low-------	Low.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Hb----------------- Hamlin	B	Rare---------	---	---	>6.0	---	---	>60	---	High-----	Low------	Low.
HoA, HoB, HoC, HoD, HoE, HpA, HpB, HpC---------- Howard	A	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Low.
LaB, LaC, LaD, LaE--------------- Lackawanna	C	None---------	---	---	2.5-6.0	Perched	Nov-Mar	>60	---	Moderate	Low------	Moderate.
LnB, LnC, LnD------ Lansing	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Low.
LoB, LoC----------- Lordstown	C	None---------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	High.
LrE*, LrF*:												
Lordstown---------	C	None---------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	High.
Oquaga------------	C	None---------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	Moderate.
MaB, MaC, MaD------ Mardin	C	None---------	---	---	1.5-2.0	Perched	Mar-May	>60	---	Moderate	Moderate	Low.
MbE*:												
Mardin------------	C	None---------	---	---	1.5-2.0	Perched	Mar-May	>60	---	Moderate	Moderate	Low.
Lackawanna--------	C	None---------	---	---	2.0-4.0	Perched	Nov-Mar	>60	---	Moderate	Low------	Moderate.
McB*, McC*:												
Mardin------------	C	None---------	---	---	1.5-2.0	Perched	Mar-May	>60	---	Moderate	Moderate	Low.
Wellsboro---------	C	None---------	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	High-----	High-----	Moderate.
MoA, MoB, MoC------ Morris	C	None---------	---	---	0.5-1.5	Perched	Nov-Mar	>60	---	High-----	High-----	Moderate.
OaB, OaC----------- Oquaga	C	None---------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	Moderate.
OlB*, OlC*, OlE*:												
Oquaga------------	C	None---------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	Moderate.
Lordstown---------	C	None---------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	High.
PhA, PhB----------- Phelps	B	None---------	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High-----	Moderate	Low.
Pt*, Pu*. Pits												

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
Ra----------------- Raynham	C	None---------	---	---	0.5-2.0	Apparent	Nov-May	>60	---	High-----	High-----	High.
Re----------------- Red Hook	C	None---------	---	---	0.5-1.5	Apparent	Dec-May	>60	---	High-----	High-----	Moderate.
RhB, RhC----------- Riverhead	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
Sa*: Saprists.												
Aquents.												
ScA, ScB----------- Scio	B	Rare---------	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High-----	Moderate	Moderate.
Te----------------- Teel	B	Occasional	Brief-----	Nov-May	1.5-2.0	Apparent	Jan-May	>60	---	High-----	Moderate	Low.
Th----------------- Teel	B	Frequent----	Brief-----	Nov-May	0.5-1.5	Apparent	Jan-May	>60	---	High-----	Moderate	Low.
Tr----------------- Trestle	B	Rare---------	---	---	3.0-6.0	Apparent	Nov-May	>60	---	Moderate	Low------	Moderate.
Tu----------------- Tuller	D	None---------	---	---	0.5-1.0	Perched	Dec-Jun	10-20	Hard	High-----	High-----	High.
Ud*: Udifluvents.												
Fluvaquents.												
Ue*. Udorthents												
UnA, UnB----------- Unadilla	B	Rare---------	---	---	>6.0	---	---	>60	---	High-----	Low------	Moderate.
VaB, VaC, VaD, VaE, VaF---------- Valois	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
VoA, VoB, VoC------ Volusia	C	None---------	---	---	0.5-1.5	Perched	Dec-May	>60	---	High-----	High-----	Moderate.
VpB*: Volusia-----------	C	None---------	---	---	0.5-1.5	Perched	Dec-May	>60	---	High-----	High-----	Moderate.
Morris------------	C	None---------	---	---	0.5-1.5	Perched	Nov-Mar	>60	---	High-----	High-----	Moderate.
Wa----------------- Wayland	C/D	Frequent----	Brief to long.	Nov-Jun	0-0.5	Apparent	Nov-Jun	>60	---	High-----	High-----	Low.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
WeB, WeC----------- Wellsboro	C	None---------	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	High-----	High-----	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--ENGINEERING INDEX TEST DATA

[Dashes indicate data were not available. NP means nonplastic]

Soil name, report number, horizon, and depth in inches	Classification		Grain size distribution										Liquid limit	Plasticity index	Moisture density		Linear shrinkage
			Percentage passing sieve--							Percentage smaller than--							
	AASHTO	Unified	2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			Max. dry density	Optimum moisture	
													Pct		Lb/FT3	PCT	Pct
Alden silt loam:[1] (S77NY-017-005)																	
AP---------0 to 5	A-5	OL	100	100	100	100	100	99	95	47	18	10	44	3	79	32	5.4
B21g-------5 to 16	A-4	CL	100	100	100	100	98	98	91	47	26	19	27	8	109	17	6.0
B22g------16 to 40	A-4	CL-ML	100	98	98	98	97	96	89	37	18	13	23	6	115	13	4.0
IICg------40 to 62	A-4	CL-ML	90	85	82	81	80	79	76	40	18	12	24	7	115	13	4.4
Arnot channery silt loam:[2] (S77NY-017-022)																	
Ap---------0 to 6	A-5	---	97	83	72	65	59	55	51	26	11	7	41	4	101	18	5.4
B21--------6 to 13	A-4	GM	79	62	50	44	40	37	35	18	9	5	34	4	109	15	4.4
B22-------13 to 16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
R---------------16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Bath channery silt loam:[3] (S77NY-017-017)																	
Ap---------0 to 11	A-4	---	99	87	78	71	66	61	56	30	12	6	39	4	102	18	4.0
B21-------11 to 15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
B22-------15 to 25	A-4	ML	95	83	75	68	63	56	52	27	11	5	28	4	110	15	4.2
A'2-------25 to 29	A-4	GM	100	88	79	72	67	57	49	24	11	6	20	3	121	12	0.8
B'x-------29 to 52	A-2, A-4	GM	97	81	69	58	50	34	26	13	7	5	18	2	131	8	1.0
C---------52 to 60	A-4	GM	97	85	76	67	58	47	40	20	10	6	21	4	124	11	1.6
Chenango channery silt loam :[4] (S77NY-017-016)																	
AP---------0 to 8	A-4	---	96	84	76	71	67	59	51	26	12	6	39	9	108	16	5.0
B2---------8 to 24	A-4	GM	97	87	78	72	67	58	50	24	11	6	33	7	113	14	5.6
IIC-------24 to 55	A-1a	GM-GW	87	53	37	28	21	10	7	4	2	1	27	5	130	9	3.2
Raynham silt loam:[5] (S77NY-017-010)																	
B21--------7 to 12	A-4	CL-ML	100	100	100	100	100	99	99	73	33	19	30	6	97	21	3.6
B22-------12 to 37	A-4	CL-ML	100	100	100	100	100	100	99	69	31	18	27	5	103	20	4.2
IIC-------37 to 48	A-2-4	SM	100	100	100	100	96	71	32	16	9	5	---	NP	115	14	1.4
IIIC2-----48 to 60	A-1-b	SM	100	100	100	100	97	49	13	8	5	3	---	NP	117	13	0

See footnotes at end of table.

TABLE 18.--ENGINEERING INDEX TEST DATA--Continued

Soil name, report number, horizon, and depth in inches	Classification		Grain size distribution										Liquid limit	Plasticity index	Moisture density		Linear shrinkage
			Percentage passing sieve--							Percentage smaller than--							
	AASHTO	Unified	2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			Max. dry density	Optimum moisture	
													Pct		Lb/FT3	PCT	Pct
Scio silt loam:[6] (S77NY-017-001)																	
Ap---------0 to 7	A-4	ML	100	100	100	100	100	99	95	44	16	9	34	2	89	26	3.0
B21--------7 to 23	A-4	ML	100	100	100	100	100	99	95	43	17	9	27	2	99	20	2.0
B22-------23 to 40	A-4	ML	100	100	100	100	100	100	97	42	14	7	23	1	105	16	1.0
C1--------40 to 51	A-4	ML	100	100	100	100	100	100	95	37	11	7	23	1	106	17	2.0
C2--------51 to 66	A-4	ML	100	100	100	100	100	100	77	21	6	3	---	---	110	15	1.6
Wayland silt loam:[7] (S77NY-017-014)																	
Ap---------0 to 9	A-6	ML	100	100	100	100	100	98	86	54	29	14	40	11	90	23	6.4
B2g--------9 to 21	A-4	CL-ML	100	100	100	100	99	94	79	42	23	12	33	8	100	23	4.0
C1g-------21 to 28	A-6	CL-ML	100	100	100	100	100	99	92	51	26	14	40	13	95	24	6.4
C2g-------28 to 47	A-4	CL-ML	100	100	100	100	100	99	93	41	22	14	27	7	106	16	4.0
C3g-------47 to 54	A-4	ML	100	100	100	100	100	100	79	34	18	13	21	4	115	13	2.8
C4g-------54 to 60	A-4	ML	100	100	100	100	100	100	79	29	15	9	22	3	112	15	2.0

[1]Alden silt loam: Town of Greene; 0.3 mile north of Johnson and Shaffer Roads intersection and 260 feet west of Johnson Road.

[2]Arnot channery silt loam: Town of Sherburne; 1.75 miles north of N.Y. Route 12B and 550 feet east of Stone House Road.

[3]Bath channery silt loam: Town of Columbus; 0.25 mile south of Lambs Corners Road and 400 feet west of Norton Road.

[4]Chenango channery silt loam: Town of Sherburne; 260 feet south of Pleasant Valley Road and 50 feet west of N.Y. Route 12.

[5]Raynham silt loam: Town of New Berlin; 1,650 feet south of N.Y. Route 23 and 100 feet west of N.Y Route 8.

[6]Scio silt loam: Town of Afton; 0.4 mile south of Maple Street and 1,000 feet east of N.Y. Route 41.

[7]Wayland silt loam: Town of Norwich; 0.25 mile west of East River Road and 100 feet south of Hale Street.

TABLE 19.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
*Alden	Fine-loamy, mixed, nonacid, mesic Mollic Haplaquepts
Aquents	Aquents
Arkport	Coarse-loamy, mixed, mesic Psammentic Hapludalfs
Arnot	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Atherton	Fine-loamy, mixed, nonacid, mesic Aeric Haplaquepts
Bath	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Canandaigua	Fine-silty, mixed, nonacid, mesic Mollic Haplaquepts
Canaseraga	Coarse-silty, mixed, mesic Typic Fragiochrepts
Carlisle	Euic, mesic Typic Medisaprists
Castile	Loamy-skeletal, mixed, mesic Aquic Dystrochrepts
Chenango	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Chippewa	Fine-loamy, mixed, mesic Typic Fragiaquepts
Fluvaquents	Fluvaquents
Greene	Fine-loamy, mixed, acid, mesic Aeric Haplaquepts
*Hamlin	Coarse-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Howard	Loamy-skeletal, mixed, mesic Glossoboric Hapludalfs
Lackawanna	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Lansing	Fine-loamy, mixed, mesic Glossoboric Hapludalfs
Lordstown	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Mardin	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Morris	Coarse-loamy, mixed, mesic Aeric Fragiaquepts
Norwich	Fine-loamy, mixed, mesic Typic Fragiaquepts
Oquaga	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Phelps	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Glossaquic Hapludalfs
*Raynham	Coarse-silty, mixed, nonacid, mesic Aeric Haplaquepts
Red Hook	Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts
*Riverhead	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Saprists	Saprists
Scio	Coarse-silty, mixed, mesic Aquic Dystrochrepts
*Teel	Coarse-silty, mixed, mesic Fluvaquentic Eutrochrepts
Trestle	Loamy-skeletal, mixed, mesic Fluventic Dystrochrepts
Tuller	Loamy-skeletal, mixed, acid, mesic Lithic Haplaquepts
Udifluvents	Udifluvents
Udorthents	Udorthents
Unadilla	Coarse-silty, mixed, mesic Typic Dystrochrepts
Valois	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Volusia	Fine-loamy, mixed, mesic Aeric Fragiaquepts
*Wayland	Fine-silty, mixed, nonacid, mesic Mollic Fluvaquents
Wellsboro	Coarse-loamy, mixed, mesic Typic Fragiochrepts

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

TABLE 20.--RELATIONSHIP BETWEEN SOIL SERIES AND THEIR POSITION, PARENT MATERIAL, AND DRAINAGE

Parent material and soil characteristics*	Excessively drained	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS ON UPLAND TILL PLAINS						
Deep, medium textured or moderately fine textured, brownish till			Lansing				
Deep, medium textured, grayish colluvium over glacial till							Alden
Deep, medium textured, brownish glacial till with a compact fragipan			Bath	Mardin	Volusia	Chippewa	Chippewa
Deep, medium textured, reddish glacial till with a compact fragipan			Lackawanna	Wellsboro	Morris	Norwich	Norwich
Deep, medium textured, brownish silt loam over a compact glacial till fragipan			Canaseraga	Canaseraga			
Deep, medium textured or moderately coarse textured, brownish glacial till			Valois				
Moderately deep, medium textured, brownish glacial till over sandstone and siltstone			Lordstown		Greene	Greene	
Moderately deep, medium textured, reddish glacial till over shale and sandstone	Oquaga	Oquaga	Oquaga				
Shallow, medium textured, brownish or reddish glacial till over sandstone or shale		Arnot	Arnot	Arnot	Tuller	Tuller	
	SOILS ON OUTWASH TERRACES, DELTAS, AND ALLUVIAL FANS IN VALLEYS						
Deep, medium textured, gravelly, brownish material over outwash sand and gravel		Chenango	Chenango	Castile	Red Hook	Atherton	Atherton
Deep, medium textured, gravelly, brownish material with an accumulation of clay in the subsoil, over outwash sand and gravel		Howard	Howard	Phelps			
Deep, moderately coarse textured, nongravelly, brownish material over sand and gravel or sand			Riverhead				
Deep, moderately coarse textured and coarse textured, nongravelly, brownish material			Arkport				

See footnote at end of table

TABLE 20.--RELATIONSHIP BETWEEN SOIL SERIES AND THEIR POSITION, PARENT MATERIAL, AND DRAINAGE--Continued

Parent material and soil characteristics*	Excessively drained	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS ON LACUSTRINE PLAINS AND ALLUVIAL TERRACES IN VALLEYS						
Deep, medium textured, brownish, lacustrine and fluvial material with less than 18 percent clay in the subsoil			Unadilla	Scio	Raynham	Raynham	
Deep, medium textured, brownish, lacustrine and fluvial material with more than 18 percent in the subsoil						Canandaigua	Canandaigua
	SOILS ON FLOOD PLAINS IN VALLEYS						
Deep, medium textured, brownish alluvial sediments over sand and gravel		Trestle	Trestle				
Deep, medium textured, brownish alluvial sediments			Hamlin	Teel	Teel	Wayland	Wayland
Deep, coarse textured to moderately fine textured, brownish alluvial sediments	Udifluvents	Udifluvents	Udi- fluvents	Udifluvents	Flu- vaquents	Fluvaquents	Fluvaquents
	SOILS IN SWAMPS AND BOGS						
Deep, well decomposed organic material more more than 51 inches thick							Carlisle
Deep, well decomposed organic material more than 16 inches thick							Saprists
Deep, medium textured, grayish mineral material							Aquents
	SOILS ON TILL PLAINS AND OUTWASH TERRACES						
Deep, medium textured to coarse textured mixed soil material	Udorthents	Udorthents	Udorthents				

*Texture refers to dominant subsoil texture.

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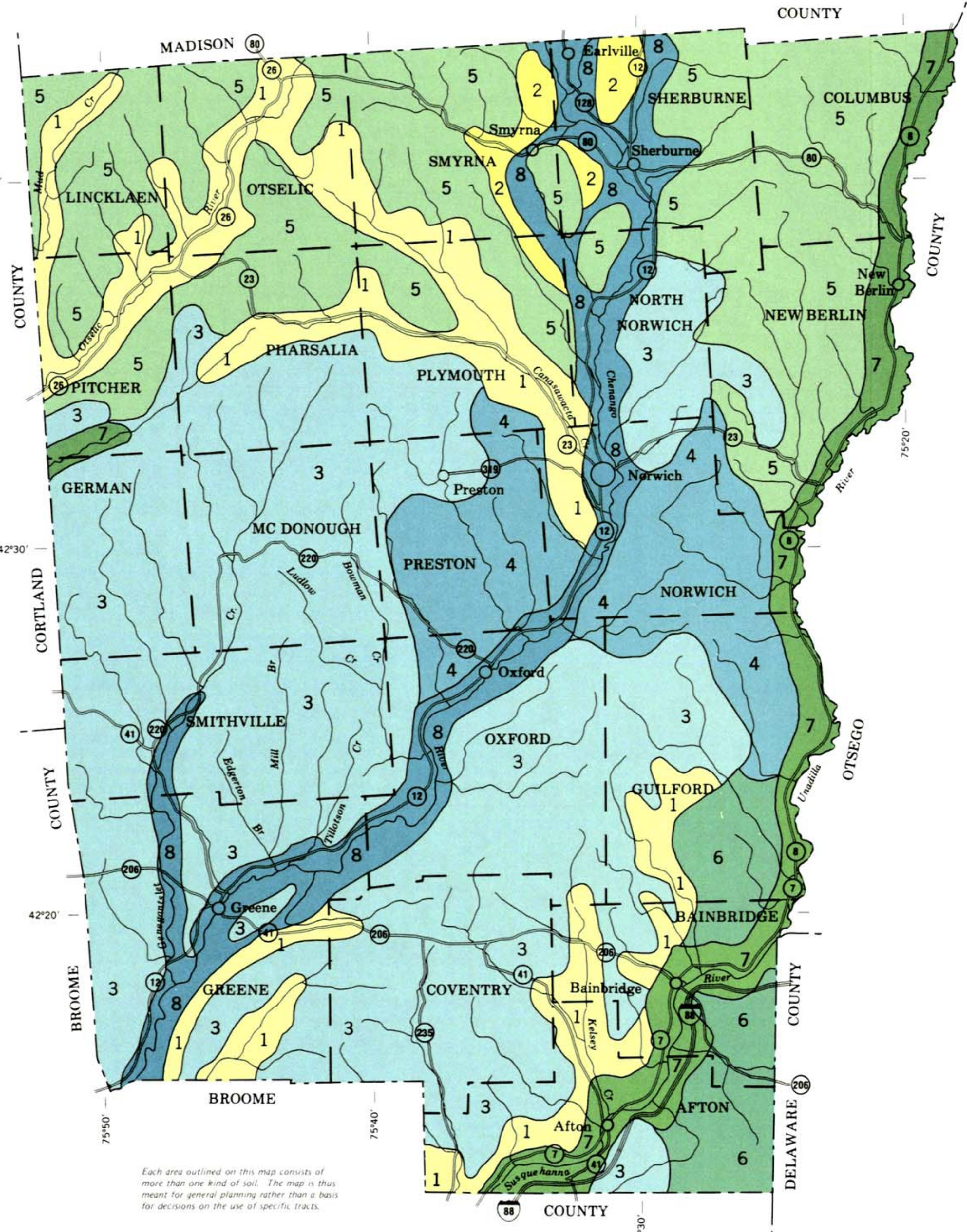

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

LEGEND

1 — BATH-VALOIS-CHENANGO: Dominantly undulating to hilly, deep, well drained to somewhat excessively drained, medium-textured soils on valley sides and valley floors

2 — LANSING-LORDSTOWN-HOWARD: Dominantly gently sloping to steep, deep and moderately deep, well drained and somewhat excessively drained, medium-textured soils on valley sides and valley floors

3 — VOLUSIA-MARDIN-LORDSTOWN: Dominantly gently sloping to steep, deep and moderately deep, somewhat poorly drained to well drained, medium-textured soils on uplands

4 — WELLSBORO-OQUAGA-MORRIS: Dominantly gently sloping to moderately steep, deep and moderately deep, excessively drained to somewhat poorly drained, medium-textured soils on uplands

5 — MARDIN-LORDSTOWN-VOLUSIA: Dominantly gently sloping or sloping, deep and moderately deep, well drained to somewhat poorly drained, medium-textured soils on uplands

6 — LORDSTOWN-MARDIN: Dominantly gently sloping to steep, moderately deep and deep, well drained and moderately well drained, medium-textured soils on uplands and valley sides

7 — CHENANGO-HAMLIN-WAYLAND: Dominantly nearly level or gently sloping; deep; somewhat excessively drained, well drained, poorly drained, and very poorly drained; medium-textured soils on valley floors

8 — HOWARD-VALOIS-TEEL: Dominantly nearly level to sloping, deep, somewhat excessively drained to somewhat poorly drained, medium-textured soils on valley floors and lower valley sides

Compiled 1983

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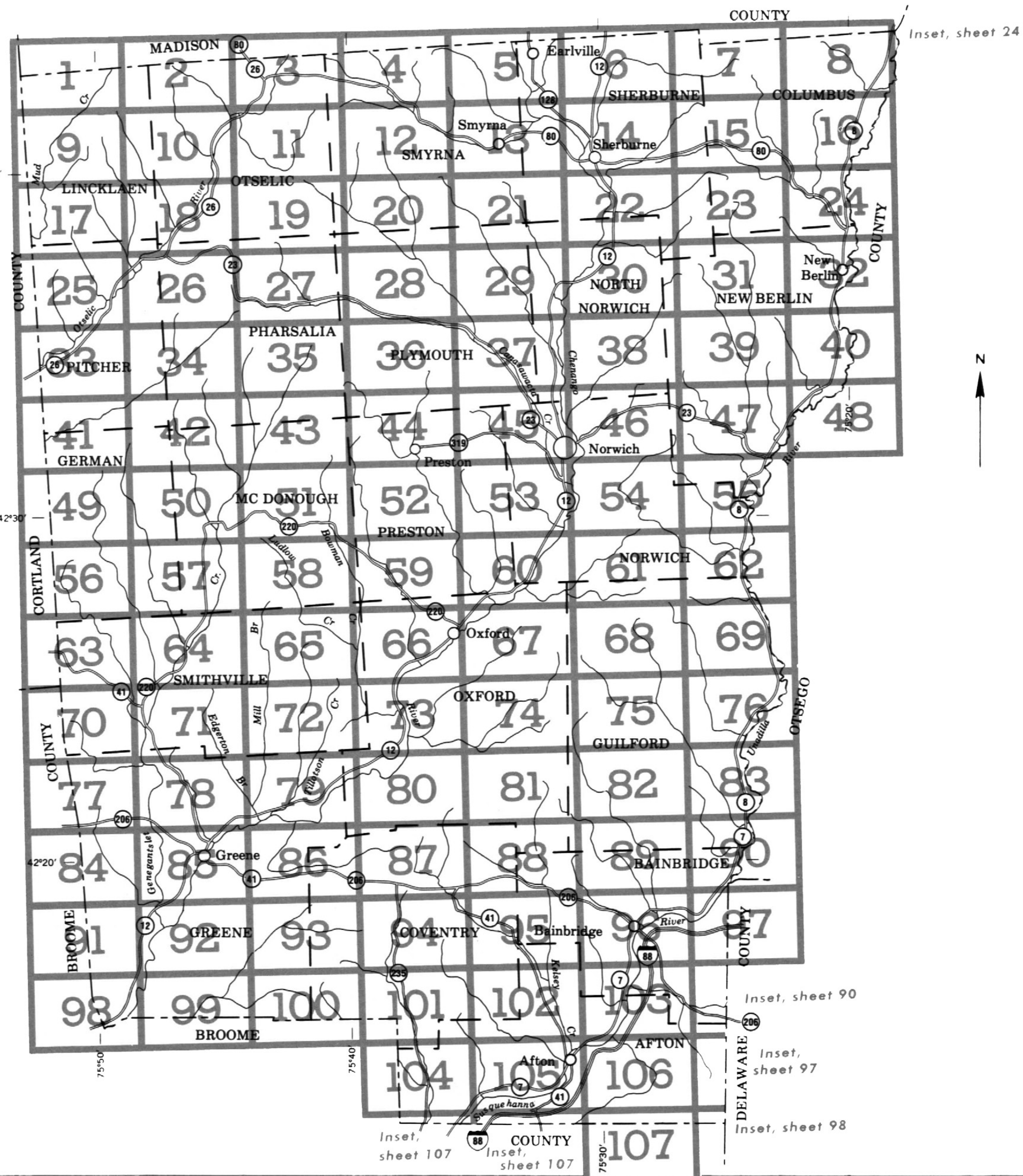
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CORNELL UNIVERSITY AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP
CHENANGO COUNTY, NEW YORK

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km



INDEX TO MAP SHEETS

CHENANGO COUNTY, NEW YORK

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

SOIL LEGEND

Publications symbols consist of letters. The first letter, always a capital, is the initial letter of the soil name. The second letter is lower case and separates map units, other than those based on slope having names that begin with the same letter. The third letter, always a capital A, B, C, D, E, or F, indicates the slope. Symbols without a slope letter are for nearly level soils, soils named for taxa of higher categories, or for miscellaneous areas.

SYMBOL	NAME
Ad	Alden silt loam
ArB	Arkport fine sandy loam, 3 to 8 percent slopes
AsB	Arnot channery silt loam, 3 to 8 percent slopes
AsC	Arnot channery silt loam, 8 to 15 percent slopes
At	Atherton silt loam
BaB	Bath channery silt loam, 3 to 8 percent slopes
BaC	Bath channery silt loam, 8 to 15 percent slopes
BaD	Bath channery silt loam, 15 to 25 percent slopes
BvB	Bath-Valois gravelly silt loams, undulating
BvC	Bath-Valois gravelly silt loams, rolling
BvD	Bath-Valois gravelly silt loams, hilly
Ca	Canandaigua silt loam
CbB	Canaseraga silt loam, 3 to 8 percent slopes
CbC	Canaseraga silt loam, 8 to 15 percent slopes
Cc	Carlisle muck
CdA	Castile gravelly silt loam, 0 to 3 percent slopes
CdB	Castile gravelly silt loam, 3 to 8 percent slopes
ChA	Chenango gravelly silt loam, 0 to 3 percent slopes
ChB	Chenango gravelly silt loam, 3 to 8 percent slopes
ChC	Chenango gravelly silt loam, 8 to 15 percent slopes
ChD	Chenango gravelly silt loam, 15 to 25 percent slopes
ChE	Chenango gravelly silt loam, 25 to 35 percent slopes
CkA	Chenango channery silt loam, fan, 0 to 3 percent slopes
CkB	Chenango channery silt loam, fan, 3 to 8 percent slopes
Cm	Chippewa and Norwich soils
Cn	Chippewa and Norwich very stony silt loams
GrB	Greene silt loam, 3 to 8 percent slopes
GrC	Greene silt loam, 8 to 15 percent slopes
Ha	Hamlin silt loam, low bottom
Hb	Hamlin silt loam, high bottom
HoA	Howard gravelly loam, 0 to 3 percent slopes
HoB	Howard gravelly loam, 3 to 8 percent slopes
HoC	Howard gravelly loam, 8 to 15 percent slopes
HoD	Howard gravelly loam, 15 to 25 percent slopes
HoE	Howard gravelly loam, 25 to 35 percent slopes
HpA	Howard silt loam, 0 to 3 percent slopes
HpB	Howard silt loam, 3 to 8 percent slopes
HpC	Howard silt loam, 8 to 15 percent slopes
LaB	Lackawanna channery silt loam, 3 to 8 percent slopes
LaC	Lackawanna channery silt loam, 8 to 15 percent slopes
LaD	Lackawanna channery silt loam, 15 to 25 percent slopes
LaE	Lackawanna channery silt loam, 25 to 35 percent slopes
LnB	Lansing gravelly silt loam, 3 to 8 percent slopes
LnC	Lansing gravelly silt loam, 8 to 15 percent slopes
LnD	Lansing gravelly silt loam, 15 to 25 percent slopes
LoB	Lordstown channery silt loam, 3 to 8 percent slopes
LoC	Lordstown channery silt loam, 8 to 15 percent slopes
LrE	Lordstown and Oquaga channery silt loams, 15 to 35 percent slopes
LrF	Lordstown and Oquaga channery silt loams, 35 to 50 percent slopes
MaB	Mardin channery silt loam, 3 to 8 percent slopes
MaC	Mardin channery silt loam, 8 to 15 percent slopes
MaD	Mardin channery silt loam, 15 to 25 percent slopes
MbE	Mardin and Lackawanna very stony silt loams, 15 to 35 percent slopes
McB	Mardin and Wellsboro very stony silt loams, 3 to 8 percent slopes
McC	Mardin and Wellsboro very stony silt loams, 8 to 15 percent slopes
MoA	Morris channery silt loam, 0 to 3 percent slopes
MoB	Morris channery silt loam, 3 to 8 percent slopes
MoC	Morris channery silt loam, 8 to 15 percent slopes
OaB	Oquaga channery silt loam, 3 to 8 percent slopes
OaC	Oquaga channery silt loam, 8 to 15 percent slopes
OlB	Oquaga and Lordstown very stony silt loams, 3 to 8 percent slopes
OlC	Oquaga and Lordstown very stony silt loams, 8 to 15 percent slopes
OlE	Oquaga and Lordstown very stony silt loams, 15 to 35 percent slopes
PhA	Phelps gravelly silt loam, 0 to 3 percent slopes
PhB	Phelps gravelly silt loam, 3 to 8 percent slopes
Pt	Pits, gravel and sand
Pu	Pits, quarry
Ra	Raynham silt loam
Re	Red Hook silt loam
RhB	Riverhead fine sandy loam, 3 to 8 percent slopes
RhC	Riverhead fine sandy loam, 8 to 15 percent slopes
Sa	Saprists and Aquents, ponded
ScA	Scio silt loam, 0 to 3 percent slopes
ScB	Scio silt loam, 3 to 8 percent slopes
Te	Teel silt loam, moderately well drained
Th	Teel silt loam, somewhat poorly drained
Tr	Trestle silt loam
Tu	Tuller channery silt loam
Ud	Udifluvents-Fluvaquents complex, frequently flooded
Ue	Udorthents, smoothed
UnA	Unadilla silt loam, 0 to 3 percent slopes
UnB	Unadilla silt loam, 3 to 8 percent slopes
VaB	Valois gravelly silt loam, 3 to 8 percent slopes
VaC	Valois gravelly silt loam, 8 to 15 percent slopes
VaD	Valois gravelly silt loam, 15 to 25 percent slopes
VaE	Valois gravelly silt loam, 25 to 35 percent slopes
VaF	Valois gravelly silt loam, 35 to 50 percent slopes
VoA	Volusia channery silt loam, 0 to 3 percent slopes
VoB	Volusia channery silt loam, 3 to 8 percent slopes
VoC	Volusia channery silt loam, 8 to 15 percent slopes
VpB	Volusia and Morris very stony silt loams, 3 to 10 percent slopes
Wa	Wayland silt loam
WeB	Wellsboro channery silt loam, 3 to 8 percent slopes
WeC	Wellsboro channery silt loam, 8 to 15 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label) — Hedley Airstrip

- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
- Double-line (label) — CANAL
- Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — CbC UnA

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Bouldery spot (less than 2 acres)

1

N

Scale 1:15 840

1 Mile
0
1/4
1/2
3/4
1

5 000 Feet
0
1000
2000
3000
4000
5000

CHENANGO COUNTY, NEW YORK NO. 1

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Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 2

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CHENANGO COUNTY, NEW YORK NO. 3

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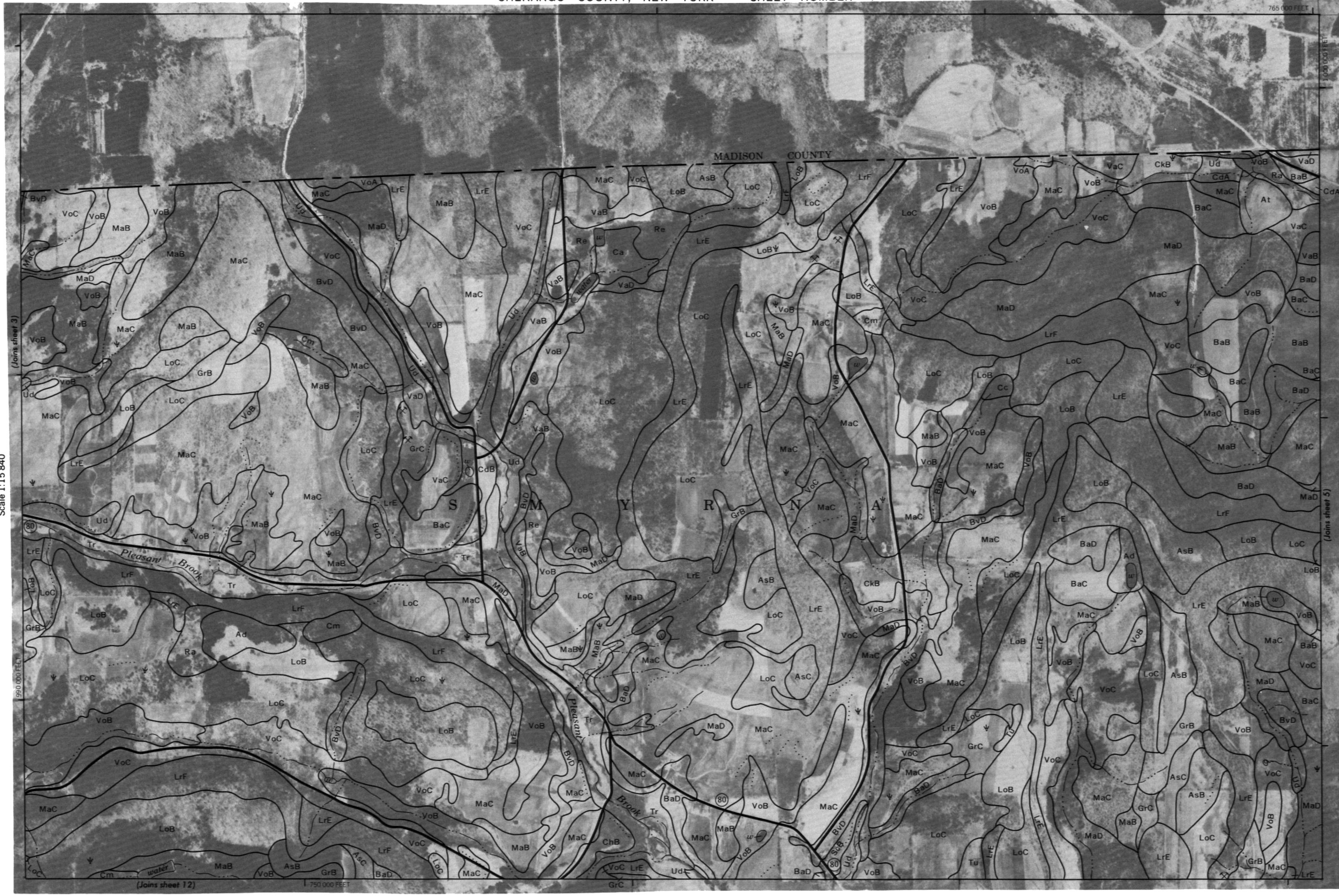
3

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 4

N

1 Mile
5 000 Feet
Scale 1:15 840
0 — 1/4 — 1/2 — 3/4 — 1
0 — 1 000 — 2 000 — 3 000 — 4 000 — 5 000



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CHENANGO COUNTY, NEW YORK NO. 4

5

N

1 Mile
5 000 Feet
Scale 1:15 840
0 ¼ ½ ¾ 1
0 1000 2000 3000 4000 5000

CHENANGO COUNTY, NEW YORK NO. 5

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7

CHENANGO COUNTY, NEW YORK NO. 7

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8

N

1 Mile

5 000 Feet

Scale 1:15 840

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CHENANGO COUNTY, NEW YORK NO. 8

CHENANGO COUNTY, NEW YORK NO. 9

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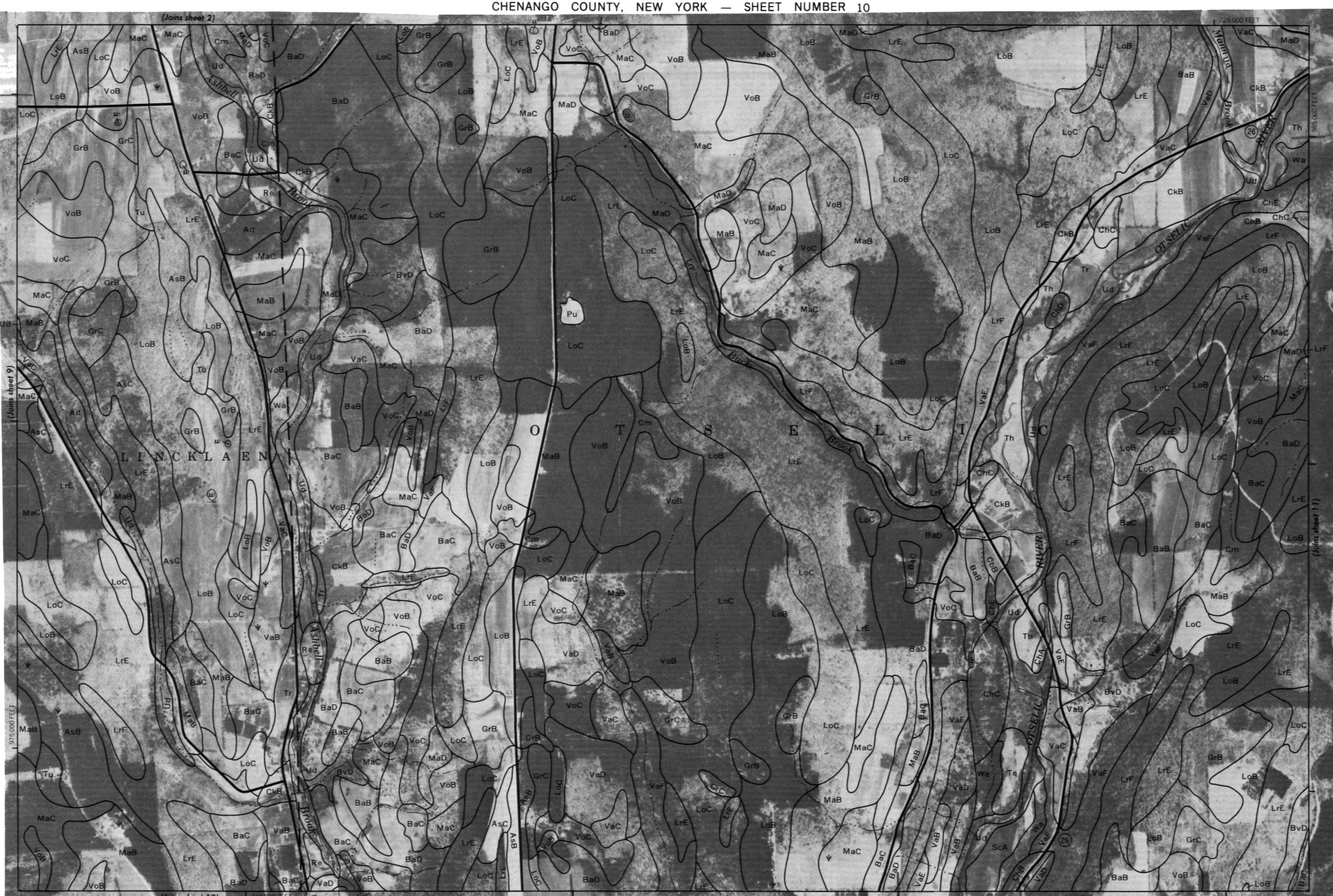
N

Scale 1:15 840

1 Mile ½ ¼ 0 ¾ 1
5 000 Feet 4 000 3 000 2 000 1 000 0 1 000 5 000



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CHENANGO COUNTY, NEW YORK — SHEET NUMBER 11

11

N

Scale 1:15 840

1 Mile

5000 Feet

CHENANGO COUNTY, NEW YORK NO. 11

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12

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CHENANGO COUNTY, NEW YORK NO. 12

CHENANGO COUNTY, NEW YORK -- SHEET NUMBER 13

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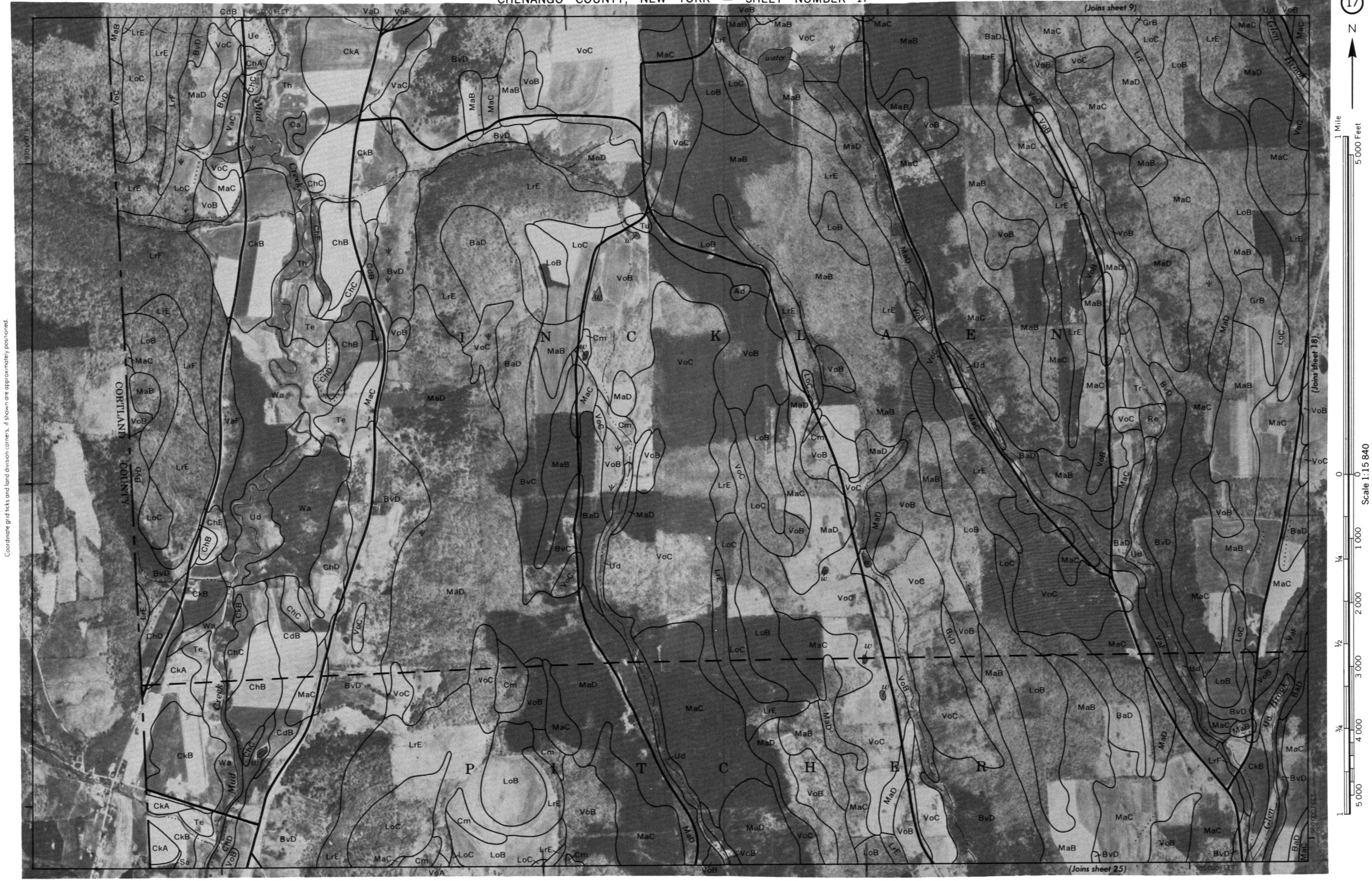

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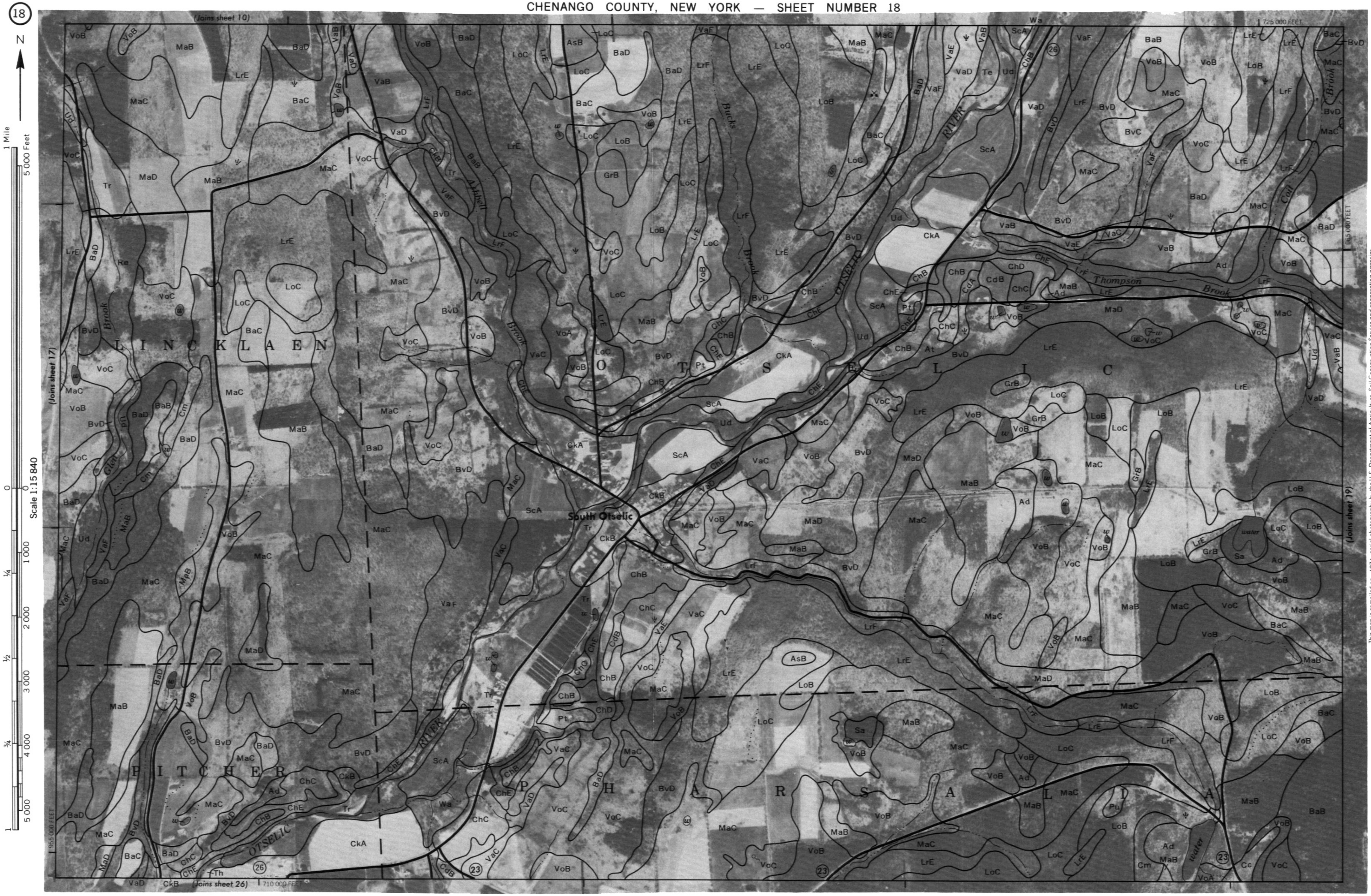

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21

N

1 Mile

5 000 Feet

Scale 1:15 840

CHENANGO COUNTY, NEW YORK NO. 21

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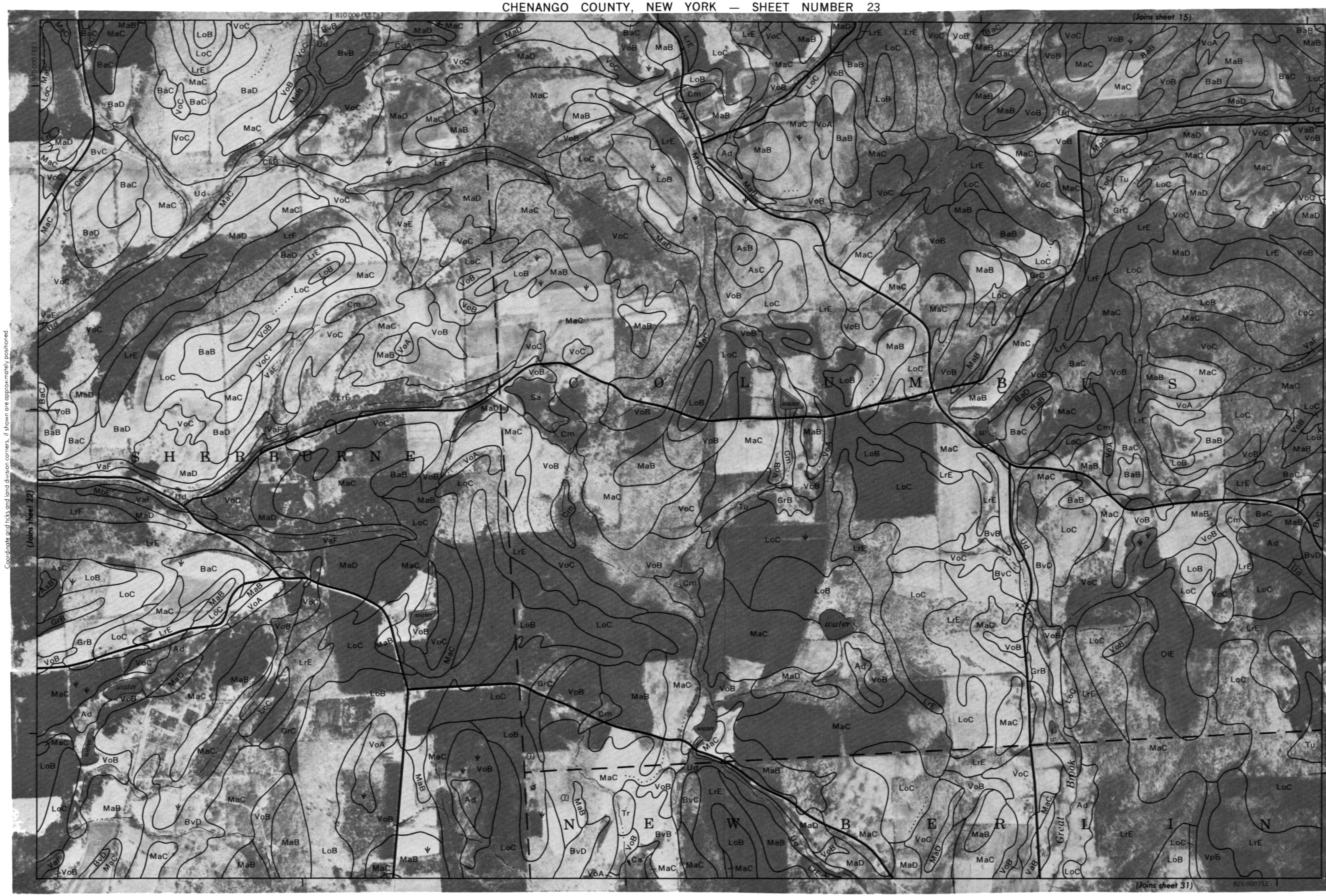
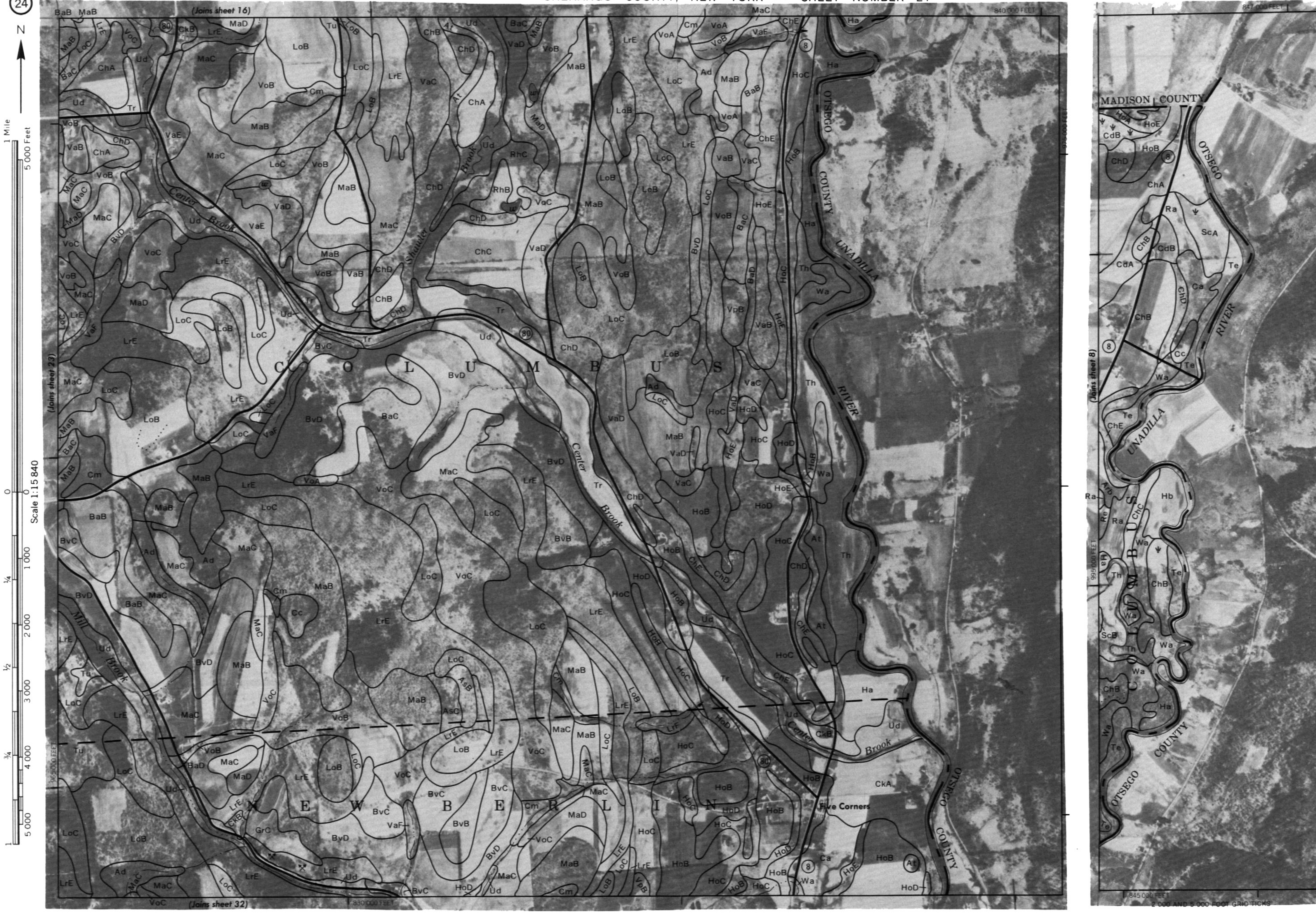


N

1 Mile
5 000 Feet
0
¼
½
¾
1
1000
2000
3000
4000
5000
Scale 1:15 840



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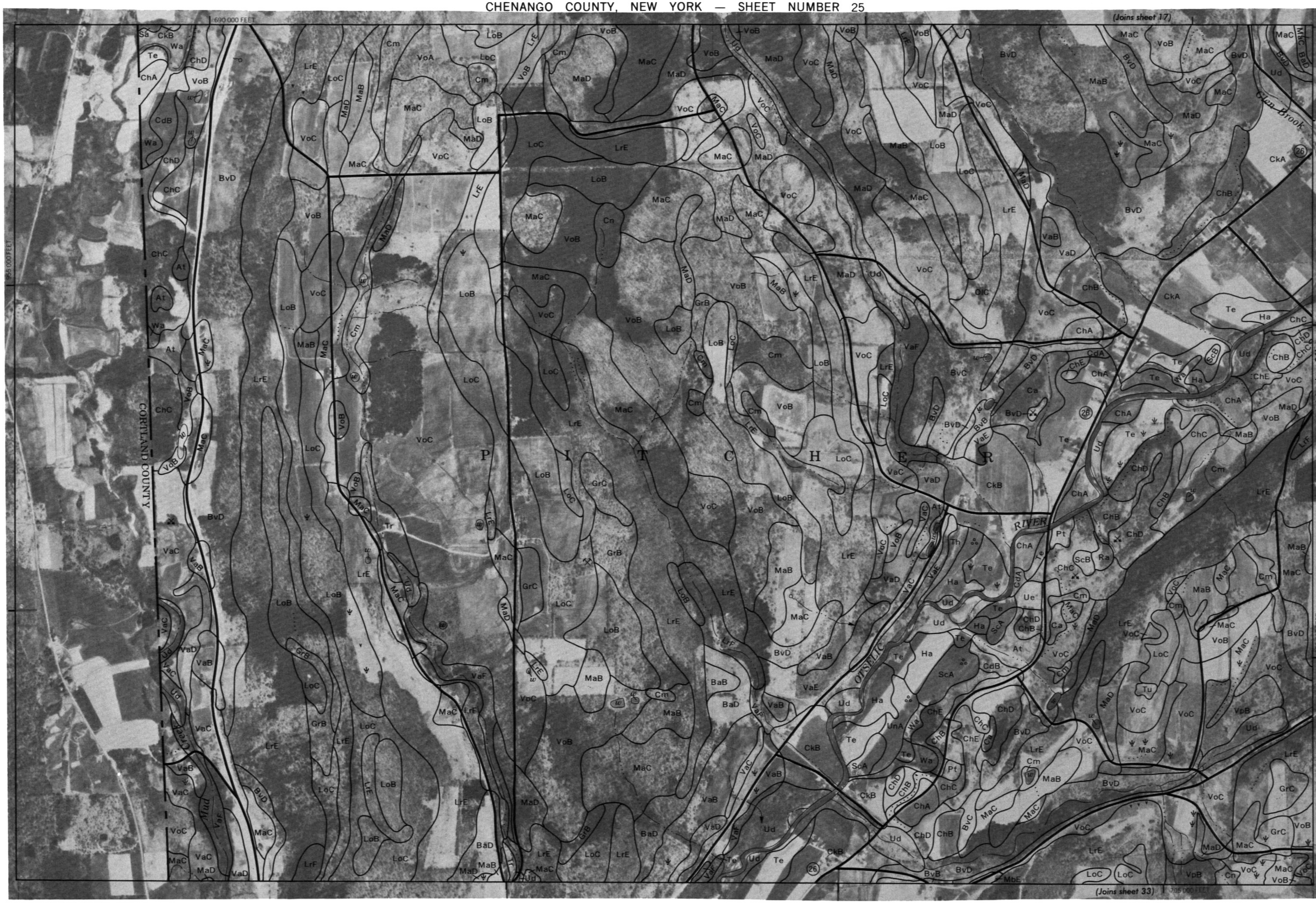
CHENANGO COUNTY, NEW YORK NO. 24

25



CHENANGO COUNTY, NEW YORK NO. 25

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Coordinate grid ticks and land division corners, if shown are approximately positioned.

N

1 Mile
0
¼
½
¾
1

5 000 Feet
0
1000
2000
3000
4000
5000

Scale 1:15 840

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CHENANGO COUNTY, NEW YORK NO. 29

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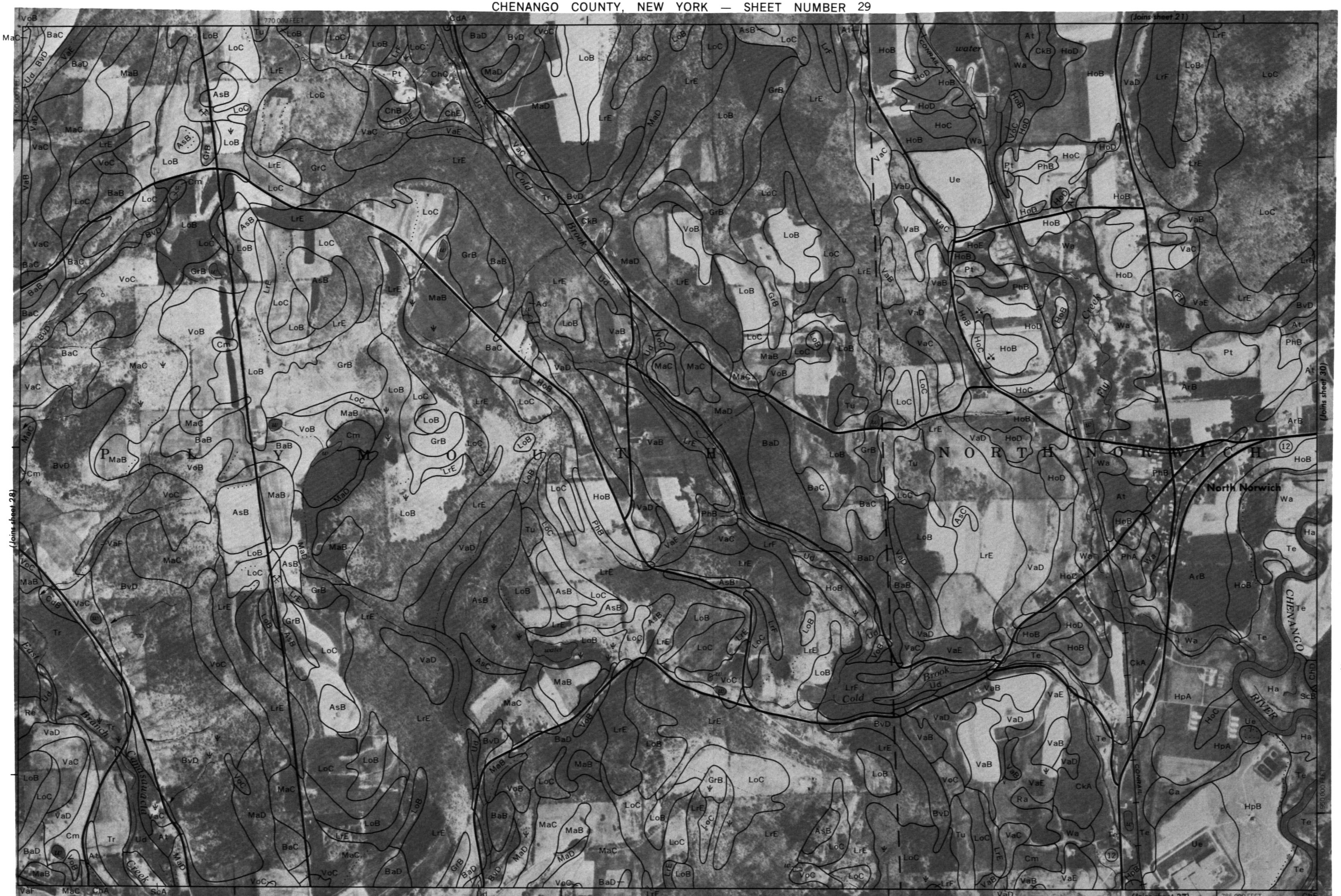

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1 000 2 000 3 000 4 000 5 000

¼ ½ ¾ 1

N

1 Mile
5 000 Feet
Scale 1:15 840
0 1000 2000 3000 4000 5000
0 ¼ ½ ¾ 1

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CHENANGO COUNTY, NEW YORK NO. 31

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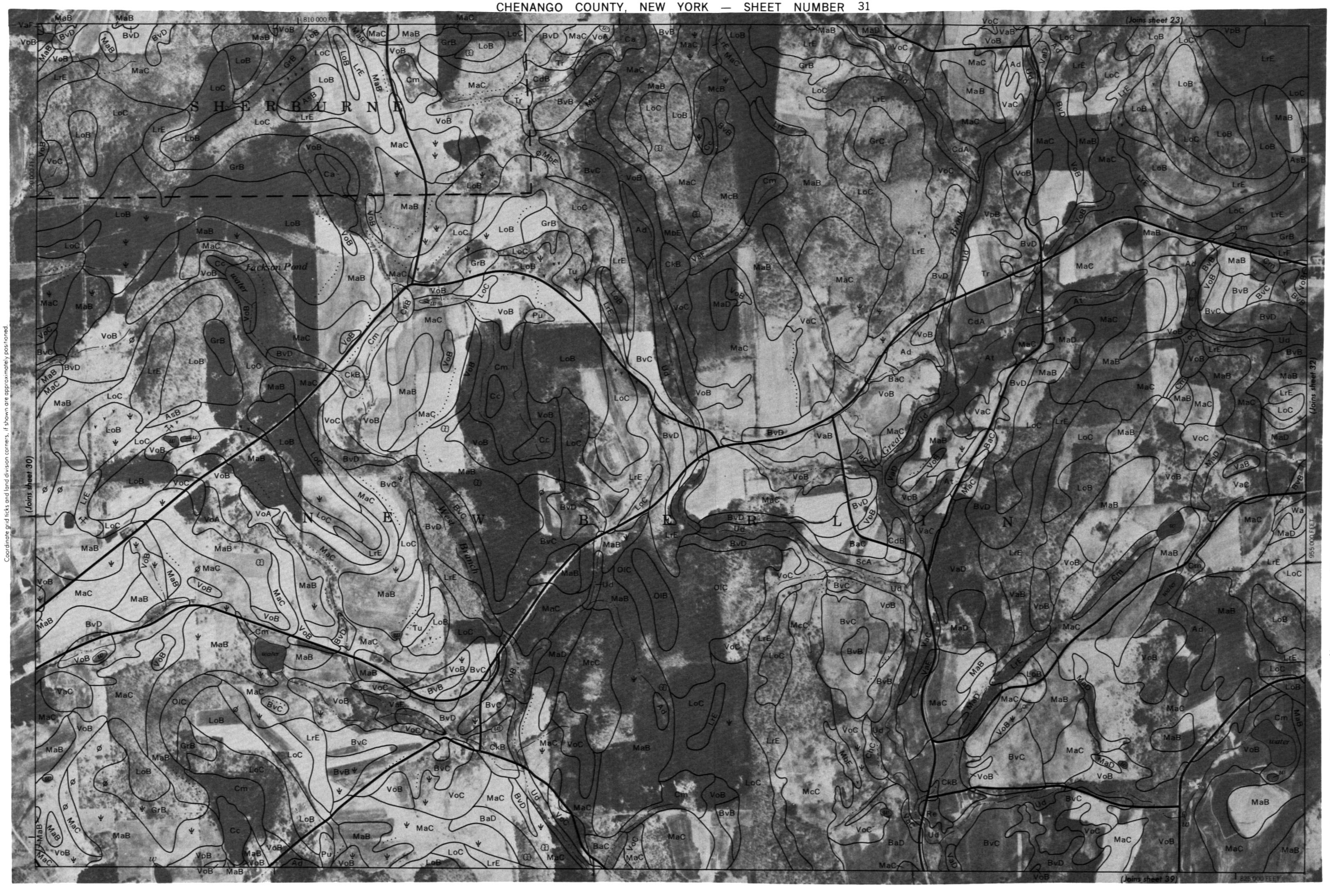

N

Scale 1:15 840

1 Mile

5 000 Feet

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

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Coordinate grid ticks and land division corners, if shown are approximately positioned

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 33

CHENANGO COUNTY, NEW YORK NO. 33

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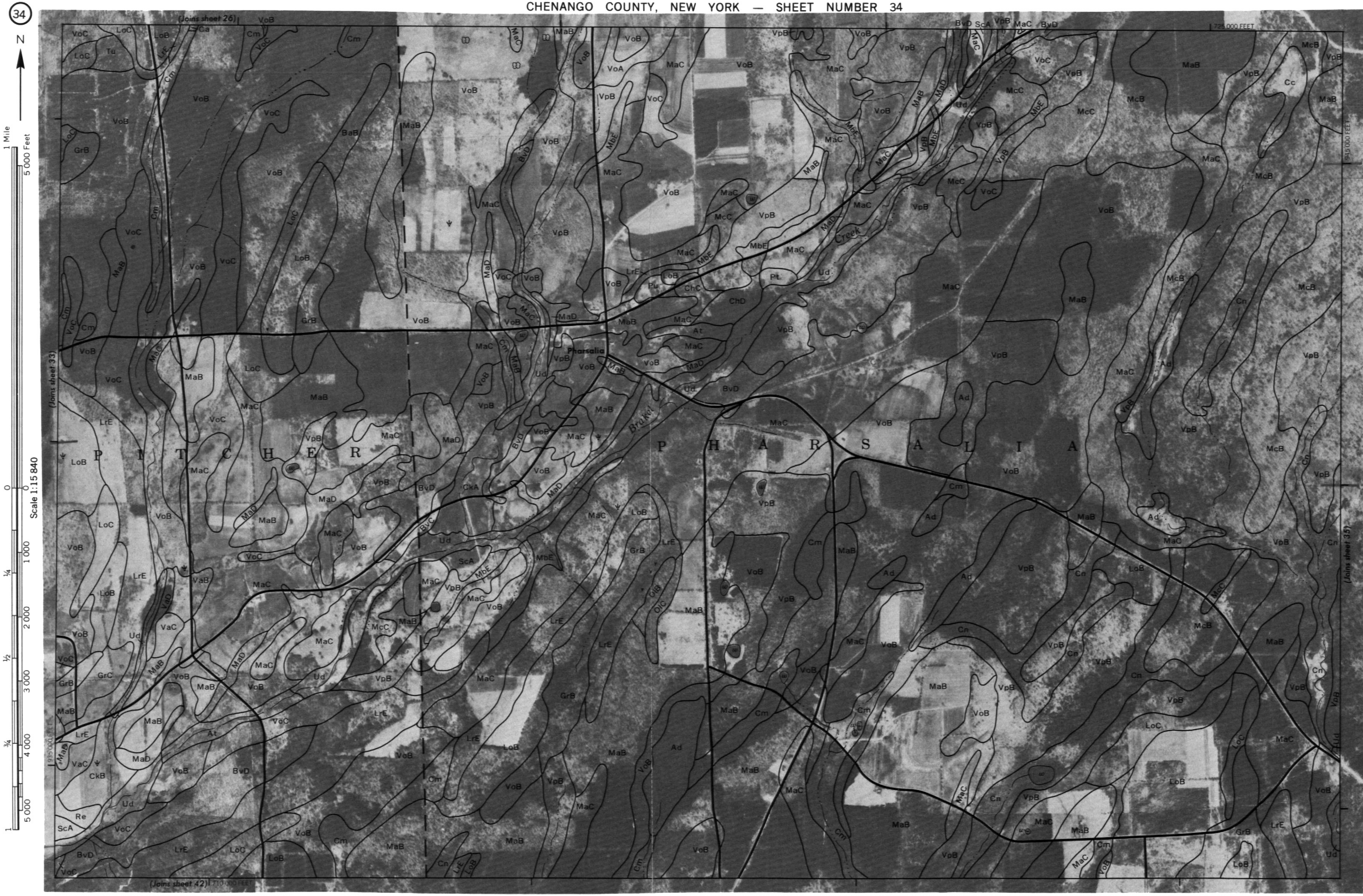
CHENANGO COUNTY, NEW YORK — SHEET NUMBER 34



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CHENANGO COUNTY, NEW YORK NO. 34

CHENANGO COUNTY, NEW YORK NO. 35

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N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

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Coordinate grid ticks and land division corners, if shown, are approximately positioned.

37

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1000 2000 3000 4000 5000

0 ¼ ½ ¾ 1

CHENANGO COUNTY, NEW YORK NO. 37

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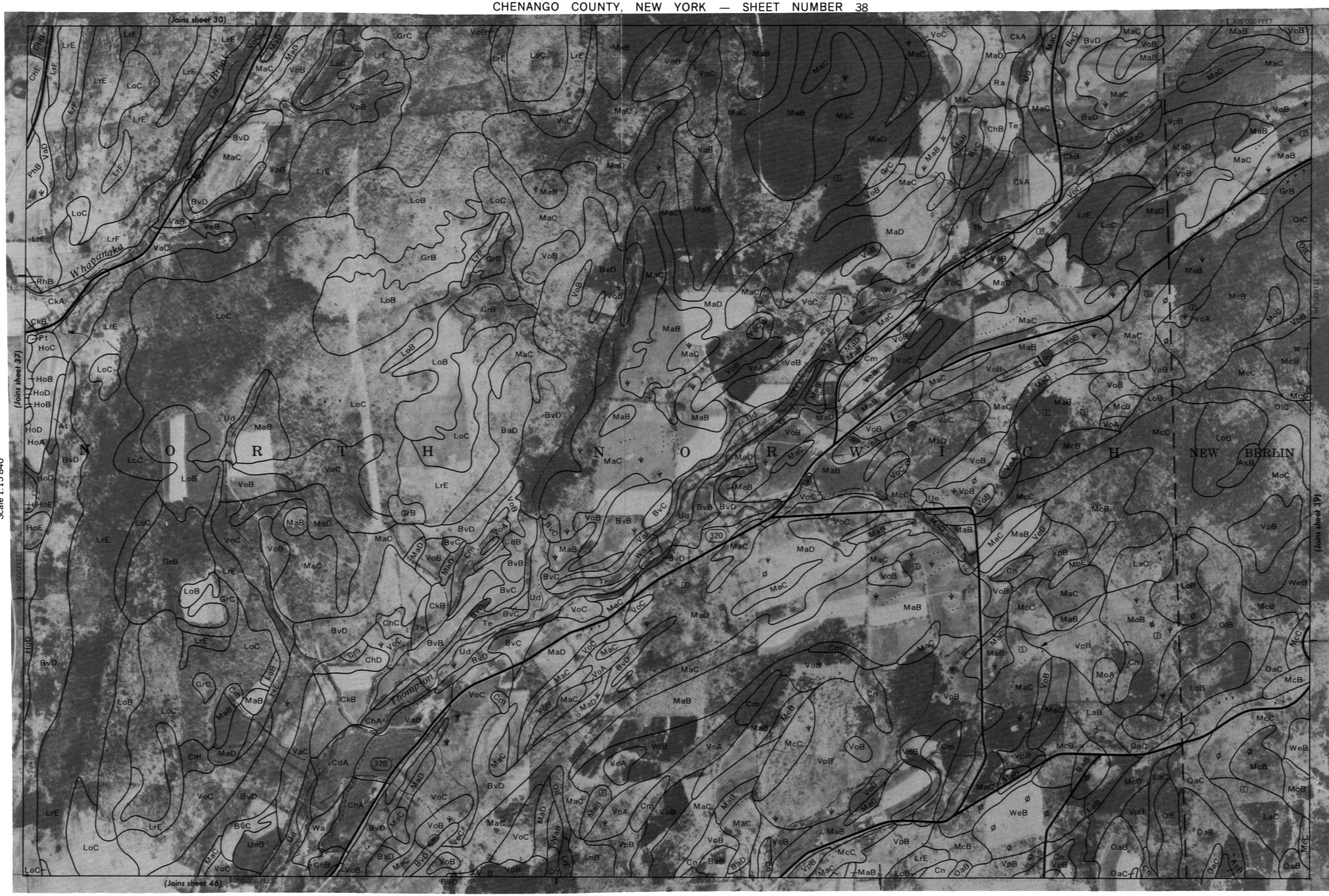
N

1 Mile

5 000 Feet

Scale 1:15 840



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CHENANGO COUNTY, NEW YORK NO. 38

N

Scale 1:15 840

1 Mile

5 000 Feet

CHENANGO COUNTY, NEW YORK NO. 39

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 40

N

1 Mile — 5 000 Feet

Scale 1:15 840

0 — 1 000 — 2 000 — 3 000 — 4 000 — 5 000

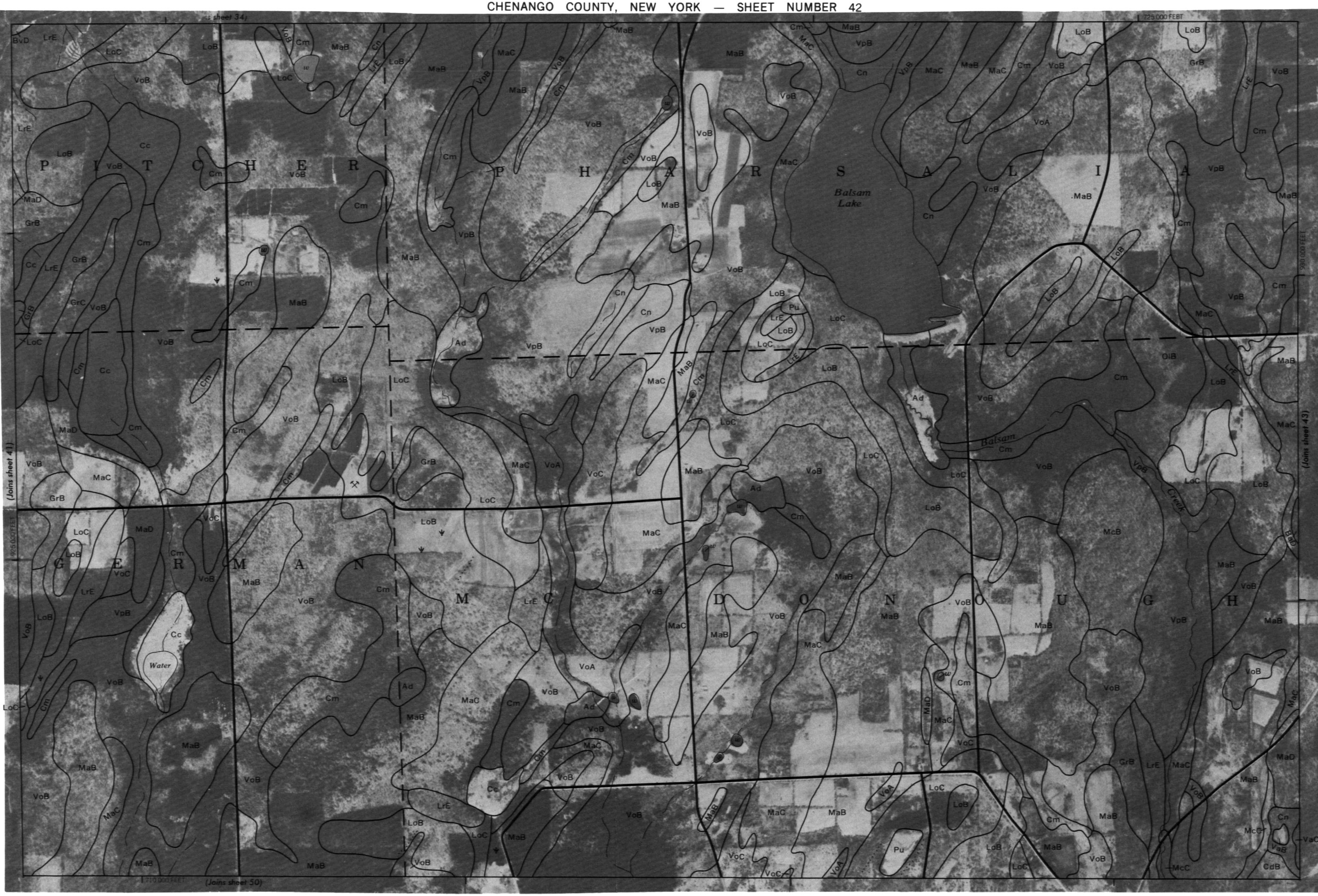
0 — ¼ — ½ — ¾ — 1

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK NO. 40

CHENANGO COUNTY, NEW YORK NO. 41

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown are approximately positioned.



N

Scale 1:15 840

1 Mile

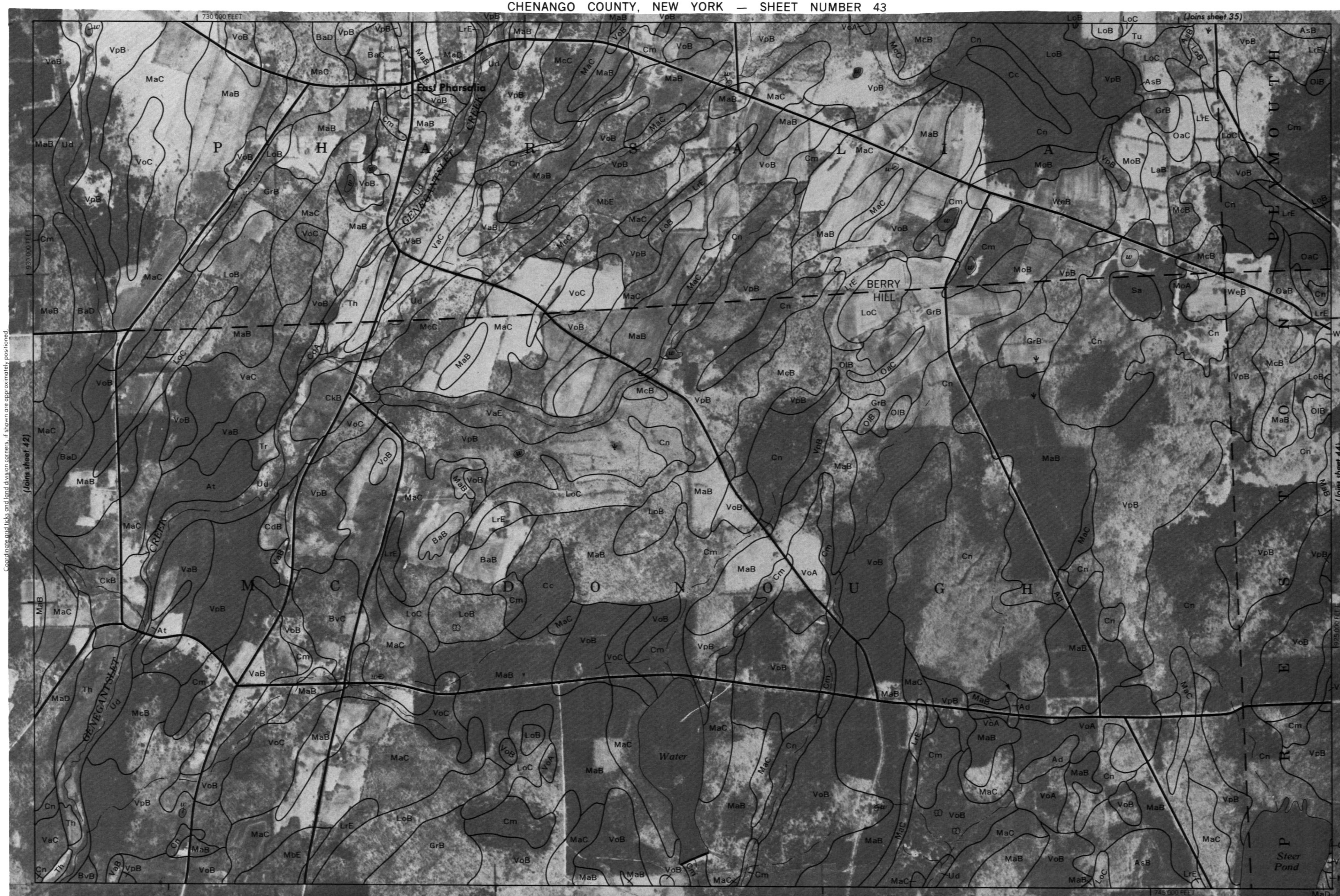
5 000 Feet

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

43



CHENANGO COUNTY, NEW YORK NO. 43

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned

45

N

Scale 1:15 840

1 Mile
5 000 Feet
0
1000
2000
3000
4000
5000
¼
½
¾
1

CHENANGO COUNTY, NEW YORK NO. 45

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.

Coordinate grid ticks and land division corners, if shown, are approximately positioned.

46

N

1 Mile
5 000 Feet
Scale 1:15 840

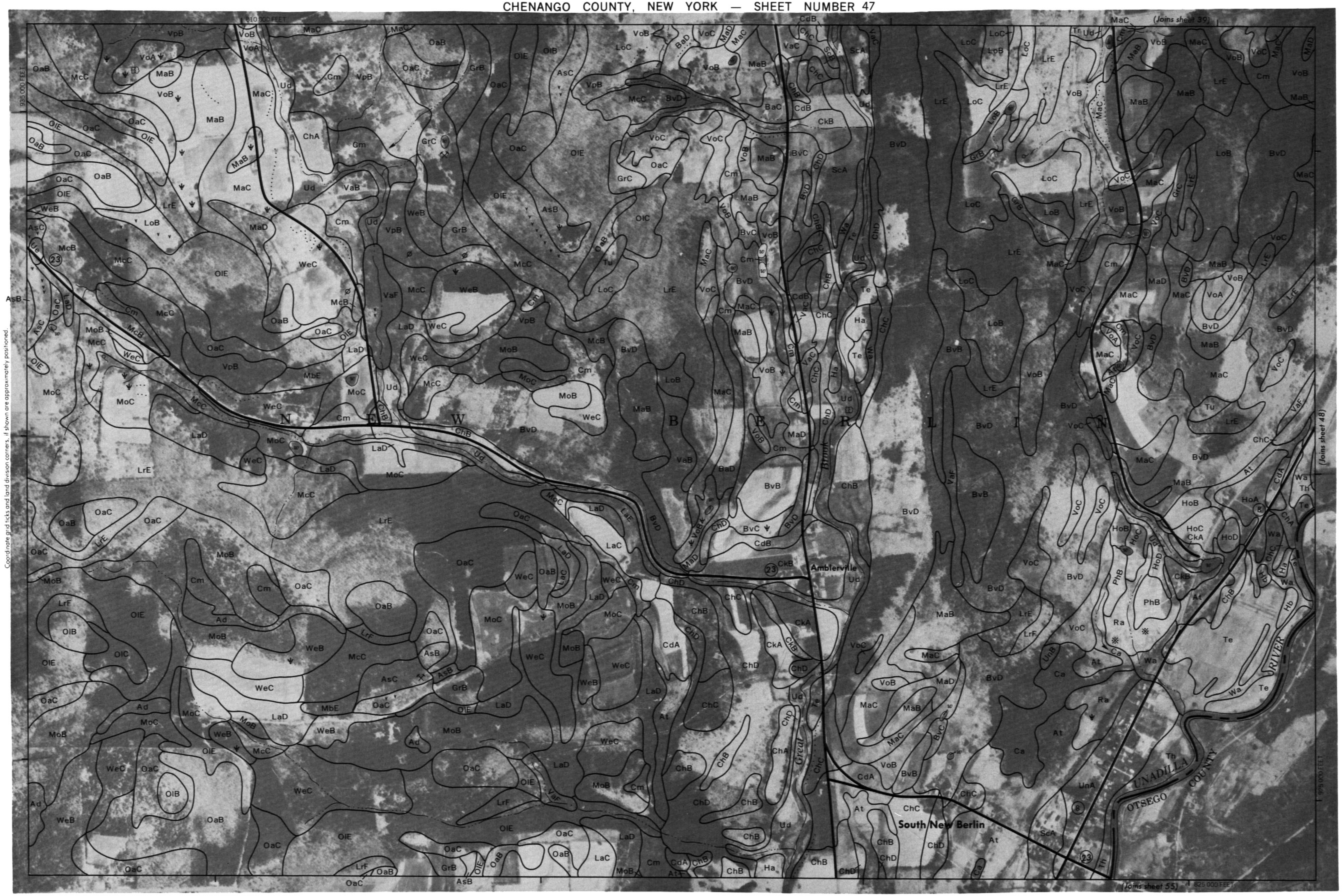
This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK NO. 46

47

CHENANGO COUNTY, NEW YORK NO. 47

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.



N

1 Mile
5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

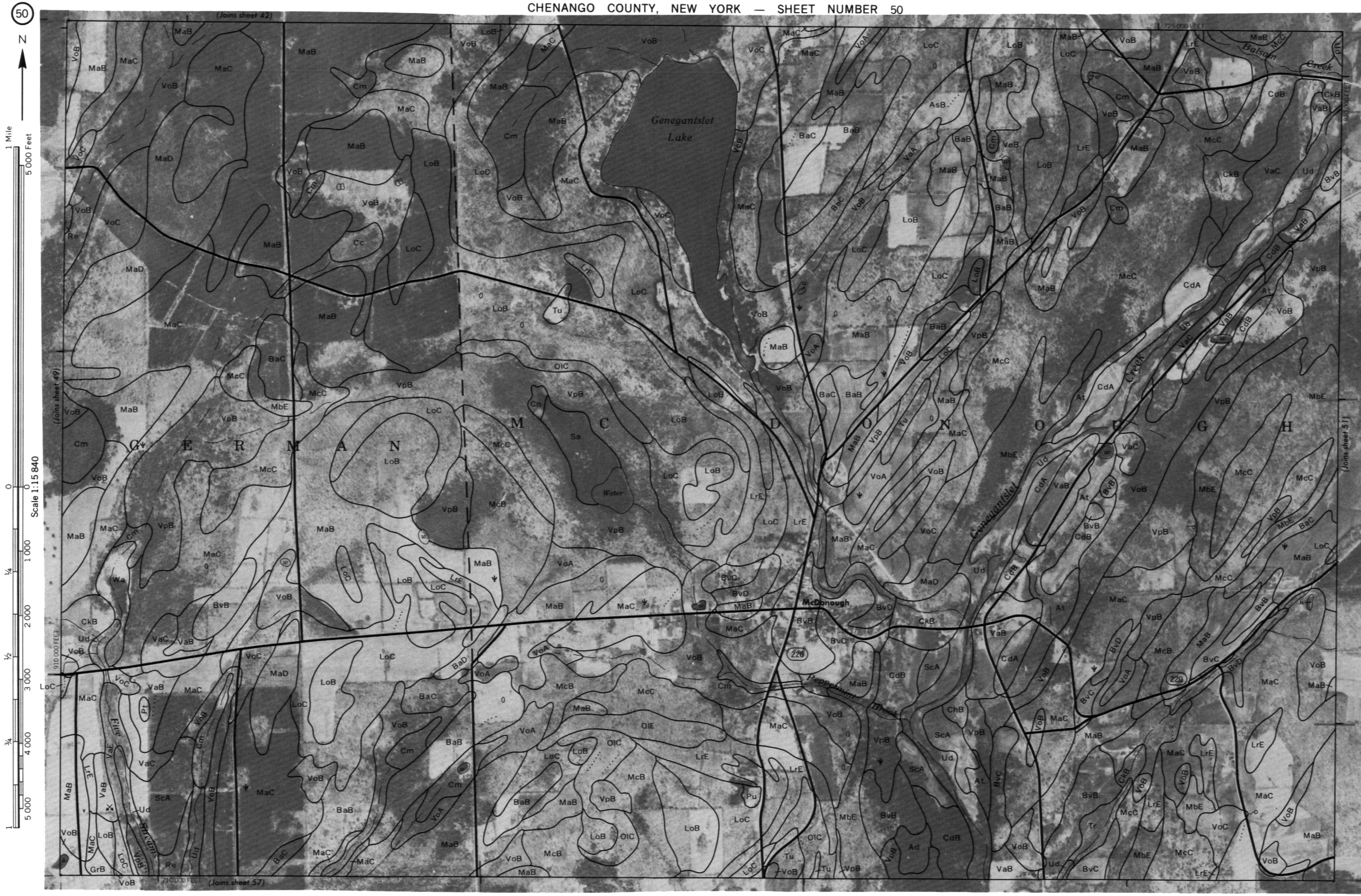
0 1000 2000 3000 4000 5000

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK NO. 48

CHENANGO COUNTY, NEW YORK NO. 49

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.



This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

(51)

CHENANGO COUNTY, NEW YORK NO. 51

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

N

1 Mile

5 000 Feet

Scale 1:15 840

0 — 1/4 — 1/2 — 3/4 — 1

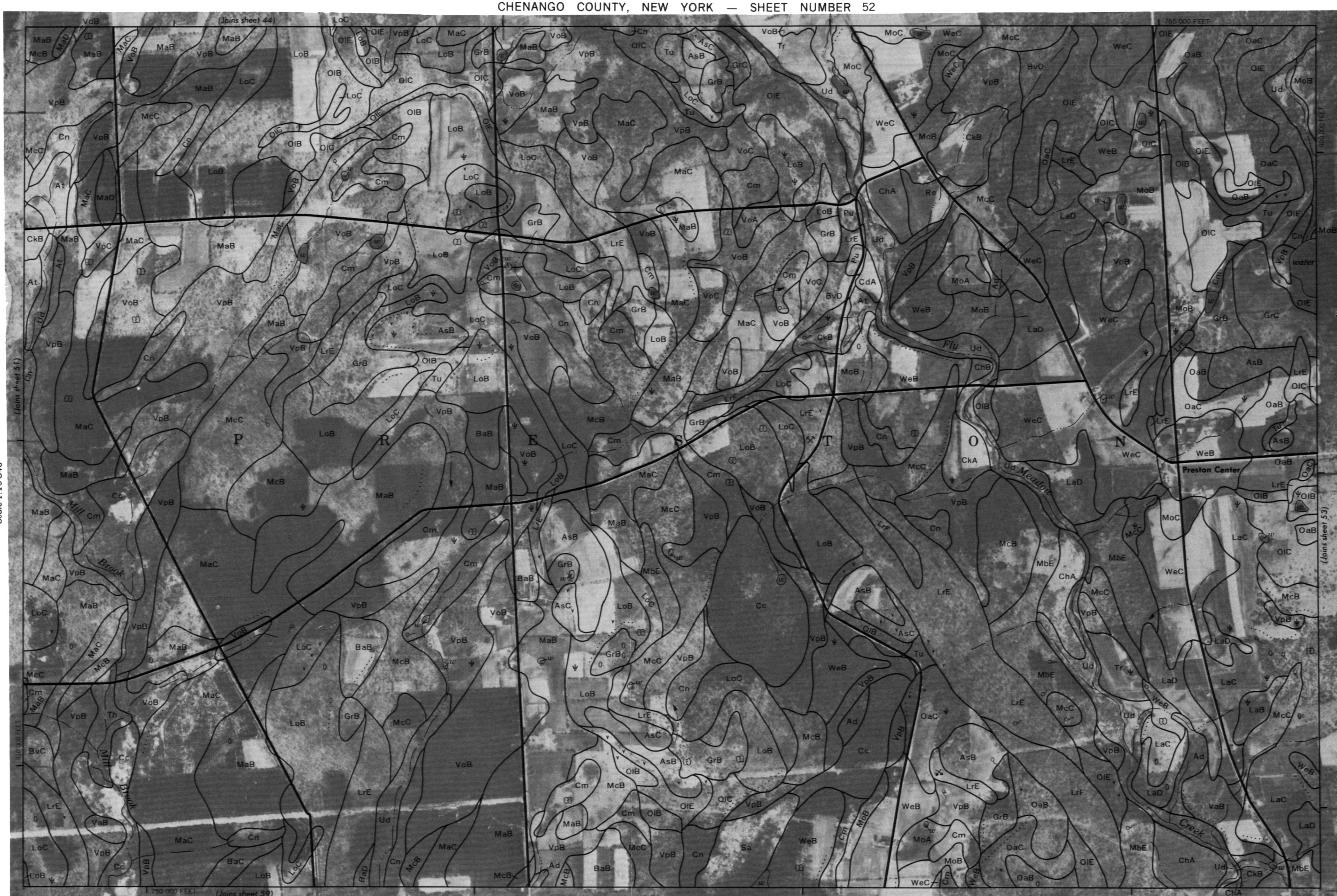
0 — 1000 — 2000 — 3000 — 4000 — 5000

N

1 Mile

5 000 Feet

Scale 1:15 840



This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

CHENANGO COUNTY, NEW YORK NO. 52

N

Scale 1:15 840

1 Mile | 0 | 1/4 | 1/2 | 3/4 | 1

5 000 Feet | 0 | 1 000 | 2 000 | 3 000 | 4 000 | 5 000

CHENANGO COUNTY, NEW YORK NO. 53

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

55

CHENANGO COUNTY, NEW YORK NO. 55

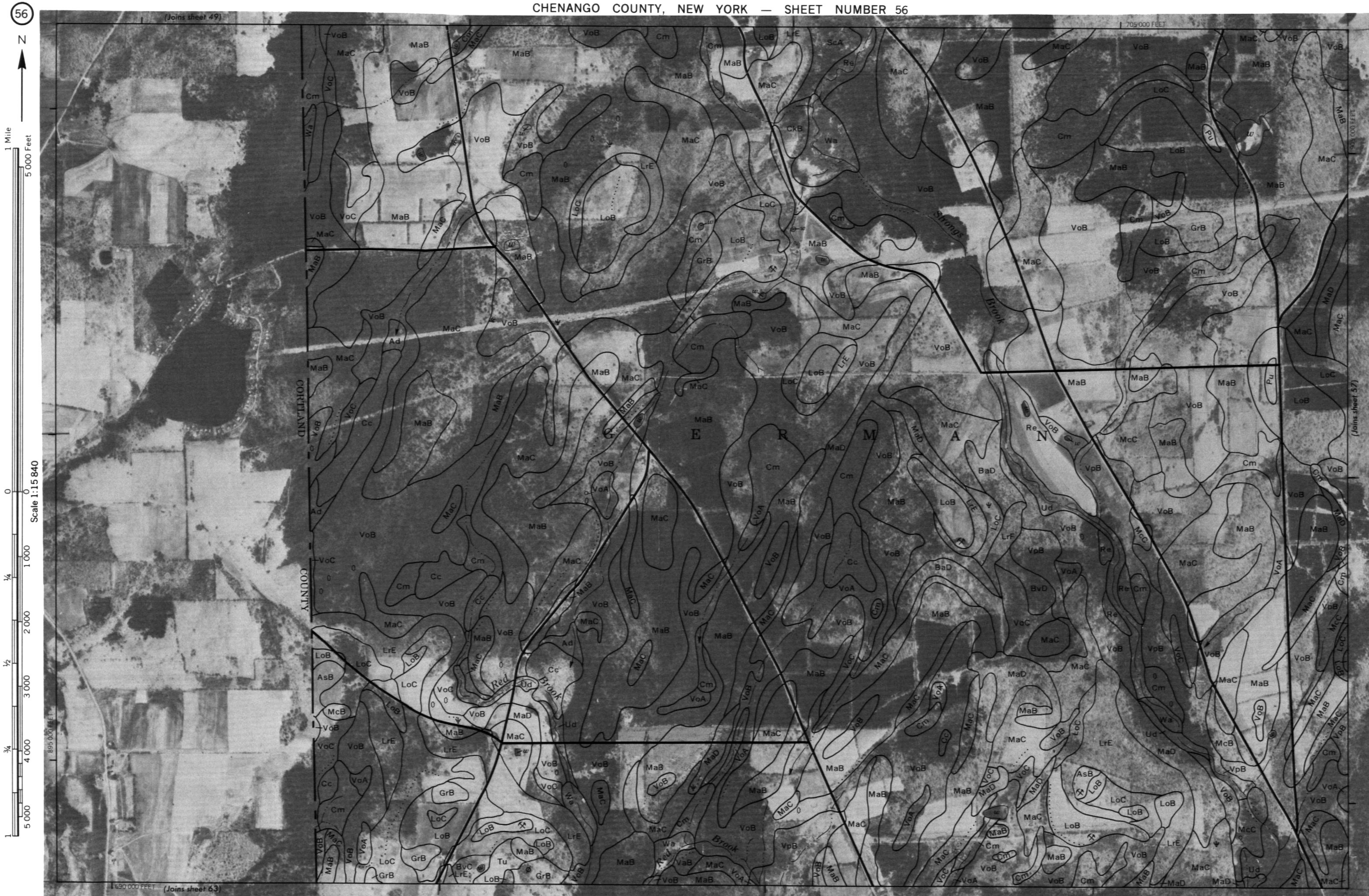
This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

N

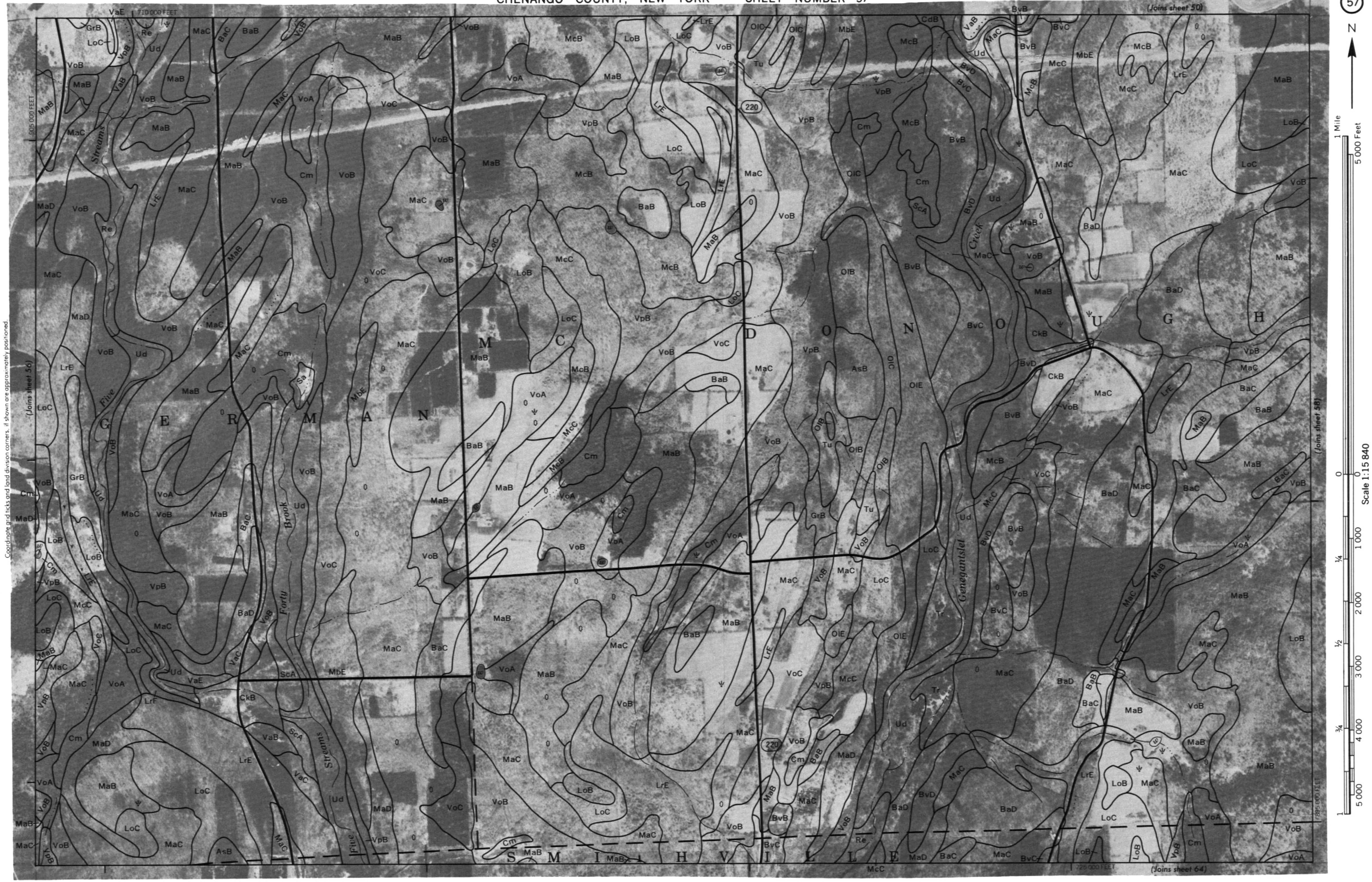
Scale 1:15 840

1 Mile
¾
½
¼
0

5 000 Feet
4 000
3 000
2 000
1 000
0



This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.



CHENANGO COUNTY, NEW YORK NO. 57

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 58

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned

CHENANGO COUNTY, NEW YORK NO. 58

CHENANGO COUNTY, NEW YORK NO. 59

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown are approximately positioned.

1 Mile — 0 — 1/4 — 1/2 — 3/4 — 1

5 000 Feet — 0 — 1000 — 2000 — 3000 — 4 000 — 5 000

Scale 1:15 840

N

1 Mile

5 000 Feet

Scale 1:15 840

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

61

CHENANGO COUNTY, NEW YORK NO. 61

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown are approximately positioned.

N

1 Mile

5 000 Feet

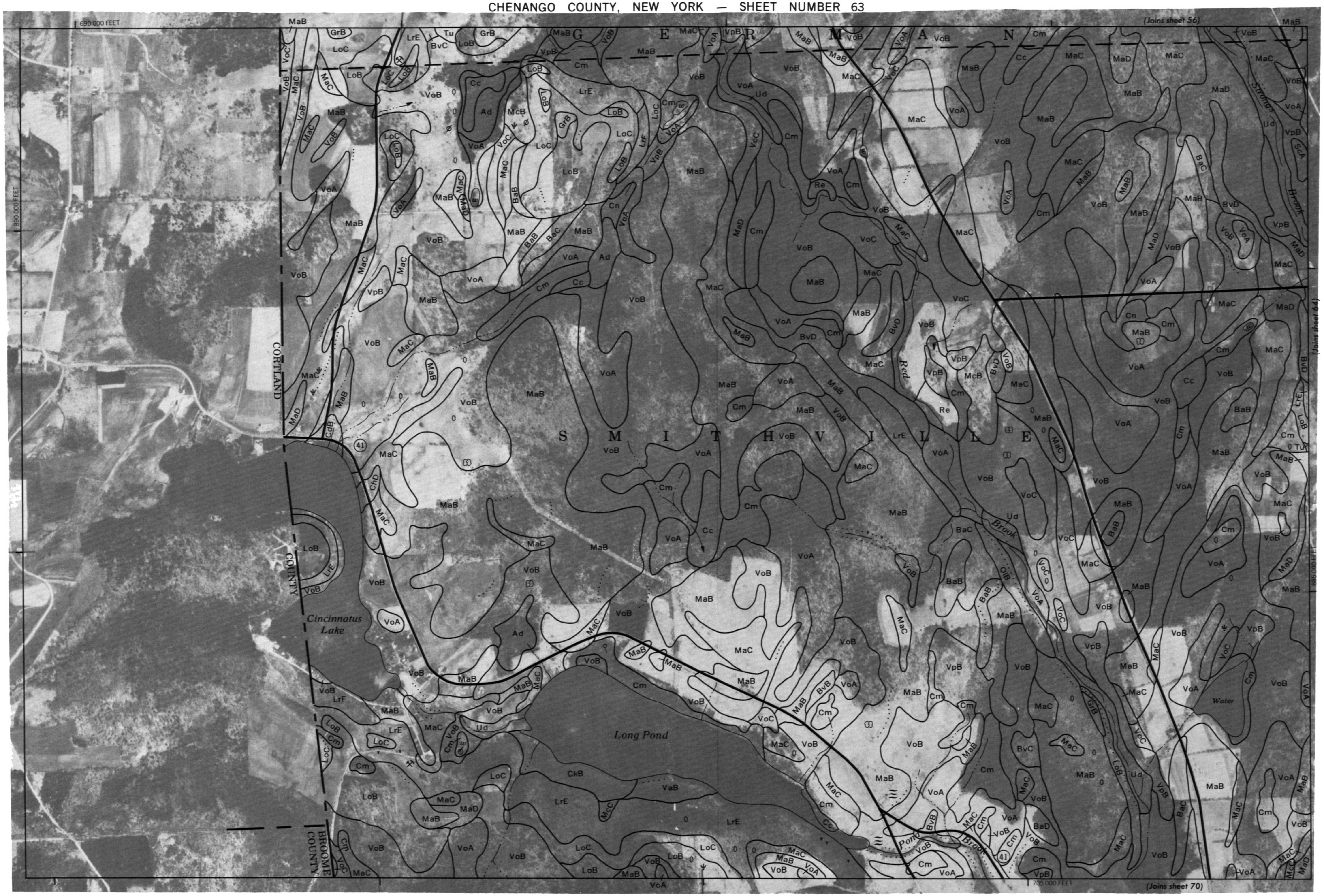
Scale 1:15 840

N

1 Mile
5 000 Feet

Scale 1:15 840

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.



N

1 Mile
5 000 Feet
0
1000
¼
2000
½
3000
4000
¾
5000
1
Scale 1:15 840

CHENANGO COUNTY, NEW YORK NO. 63

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 64

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK NO. 64

CHENANGO COUNTY, NEW YORK NO. 65

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned

CHENANGO COUNTY, NEW YORK NO. 67

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

68

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

69

CHENANGO COUNTY, NEW YORK NO. 69

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

N

1 Mile
5 000 Feet
Scale 1:15 840
0 ¼ ½ ¾ 1
0 1000 2000 3000 4000 5000

(Joins sheet 63)

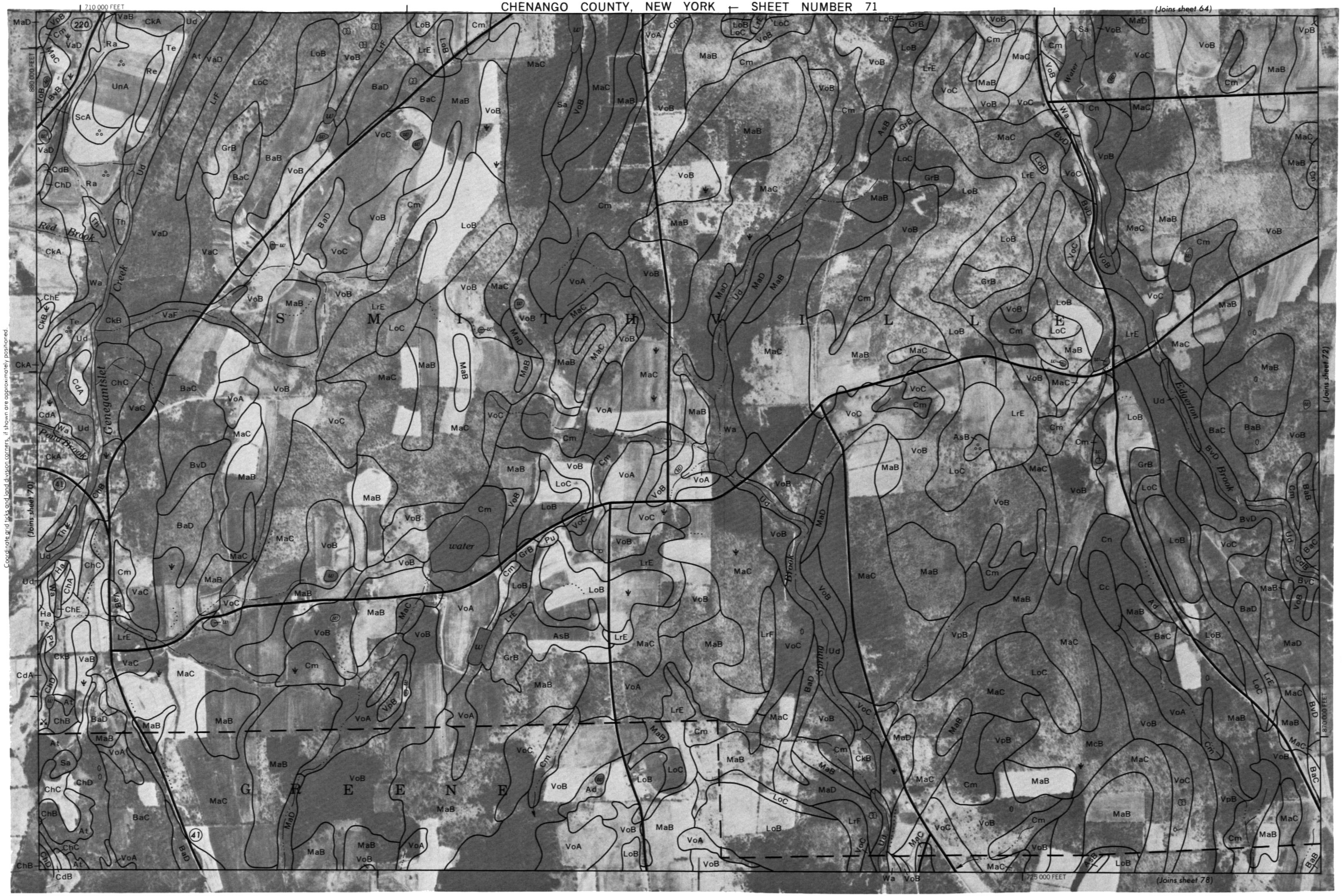
CHENANGO COUNTY, NEW YORK — SHEET NUMBER 70

(Joins sheet 71)

(Joins sheet 77)

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

(71)



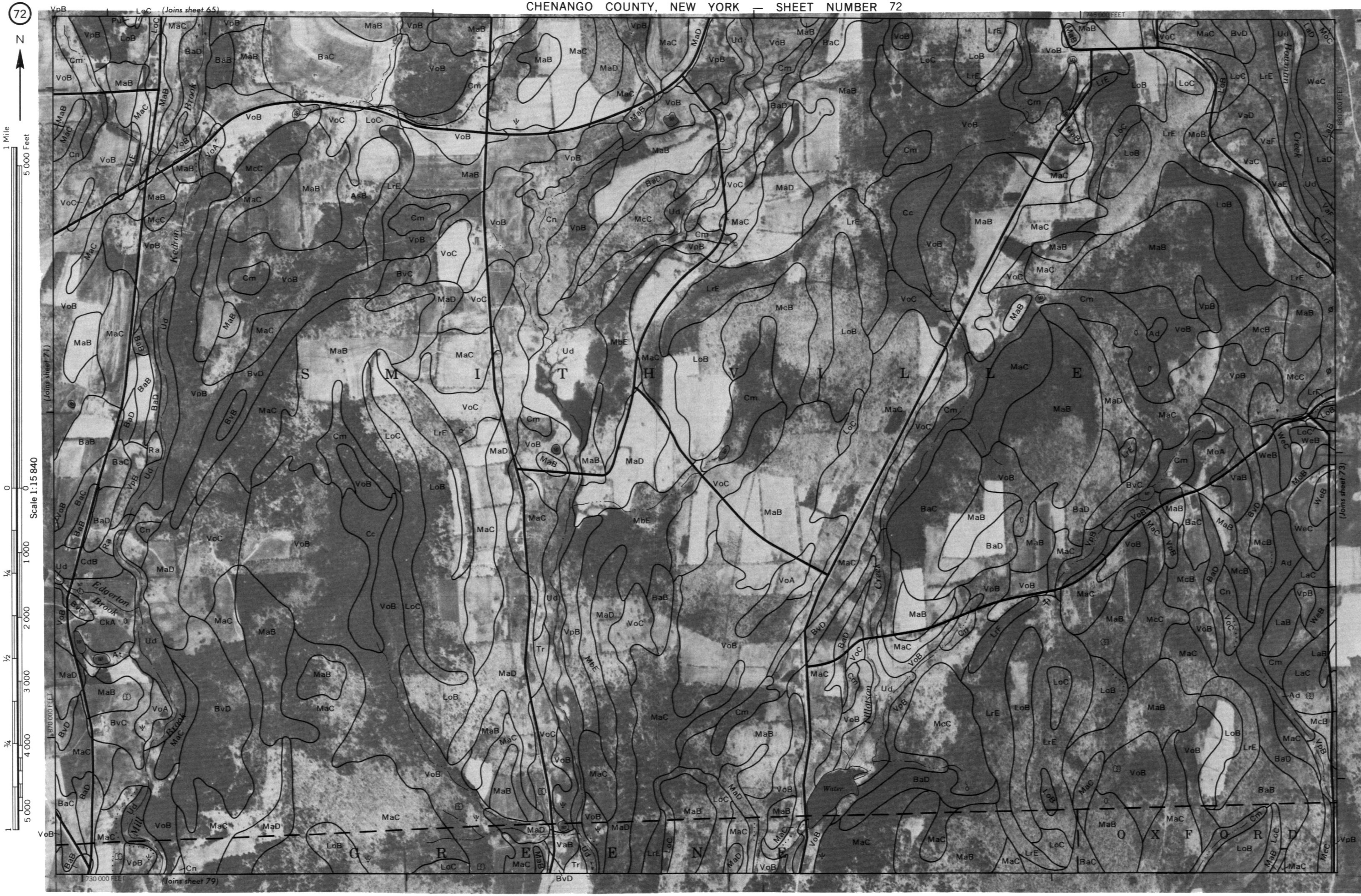
CHENANGO COUNTY, NEW YORK NO. 71

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

N

1 Mile, 0, 1/4, 1/2, 3/4, 1
5000 Feet, 0, 1000, 2000, 3000, 4000, 5000

Scale 1:15 840



This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

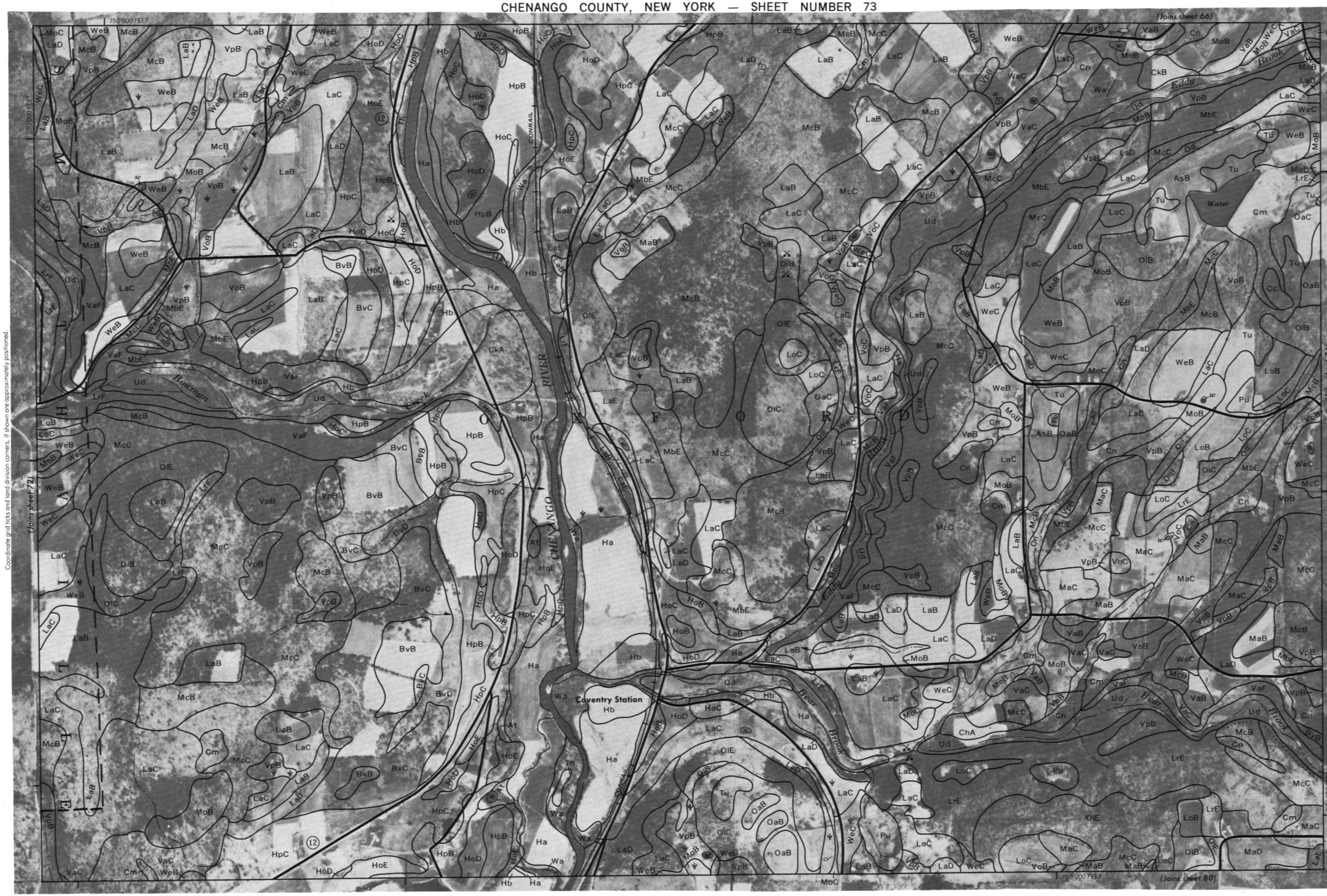
CHENANGO COUNTY, NEW YORK NO. 72

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 73

73

CHENANGO COUNTY, NEW YORK NO. 73

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



N

Scale 1:15 840

1 Mile

5 000 Feet

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

75

CHENANGO COUNTY, NEW YORK NO. 75

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 76

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 77

CHENANGO COUNTY, NEW YORK NO. 77

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown are approximately positioned.

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Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK NO. 78

CHENANGO COUNTY, NEW YORK NO. 79

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

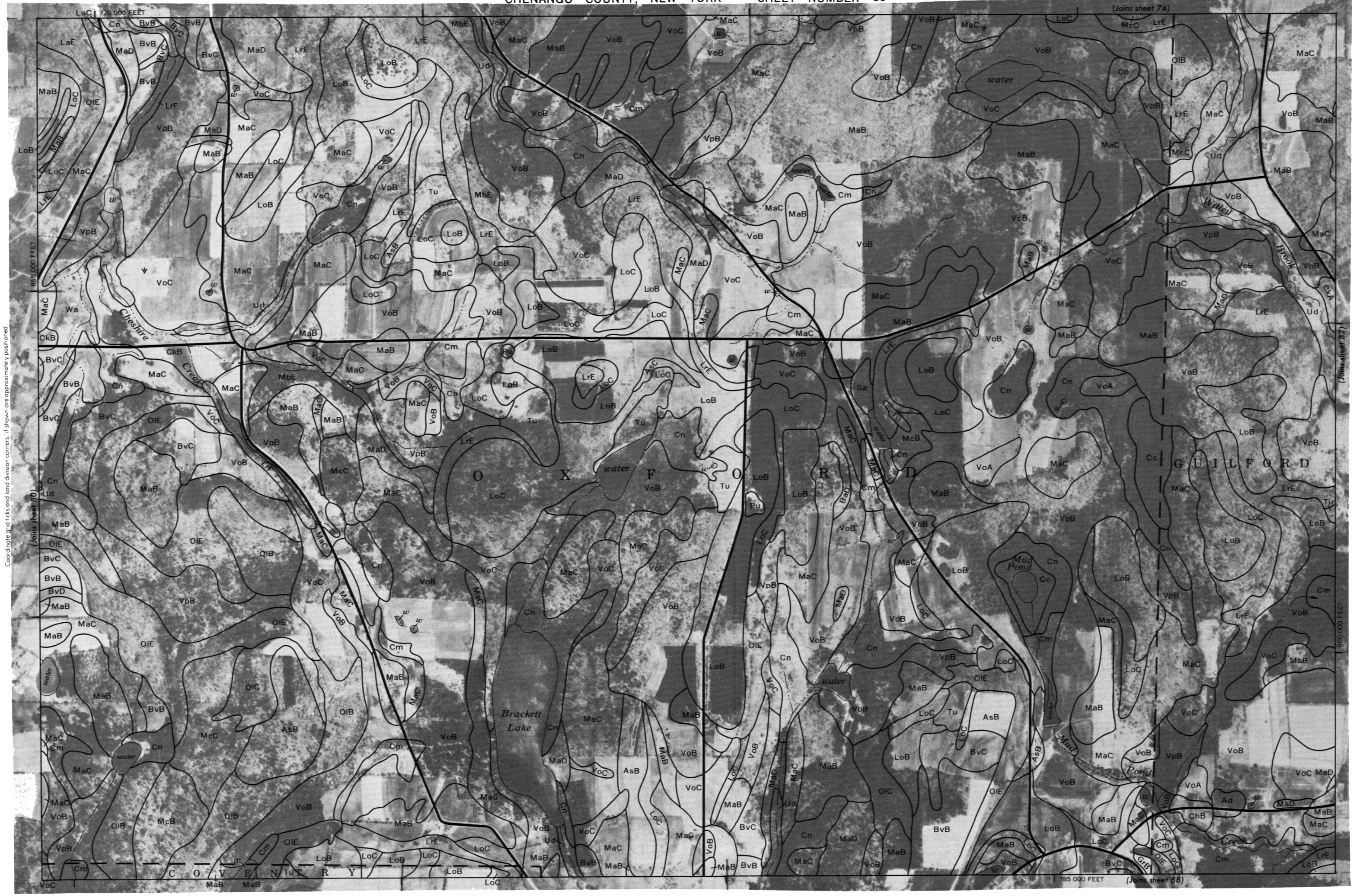
CHENANGO COUNTY, NEW YORK — SHEET NUMBER 80

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

CHENANGO COUNTY, NEW YORK NO. 80

CHENANGO COUNTY, NEW YORK NO. 81

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.



N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK NO. 83

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 84

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK NO. 84

(85)

N

1 Mile

5 000 Feet

Scale 1:15 840

CHENANGO COUNTY, NEW YORK NO. 85

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies

Coordinate grid ticks and land division corners, if shown are approximately positioned

N

1 Mile

5 000 Feet

Scale 1:15 840

0 | 1 000 | 2 000 | 3 000 | 4 000 | 5 000

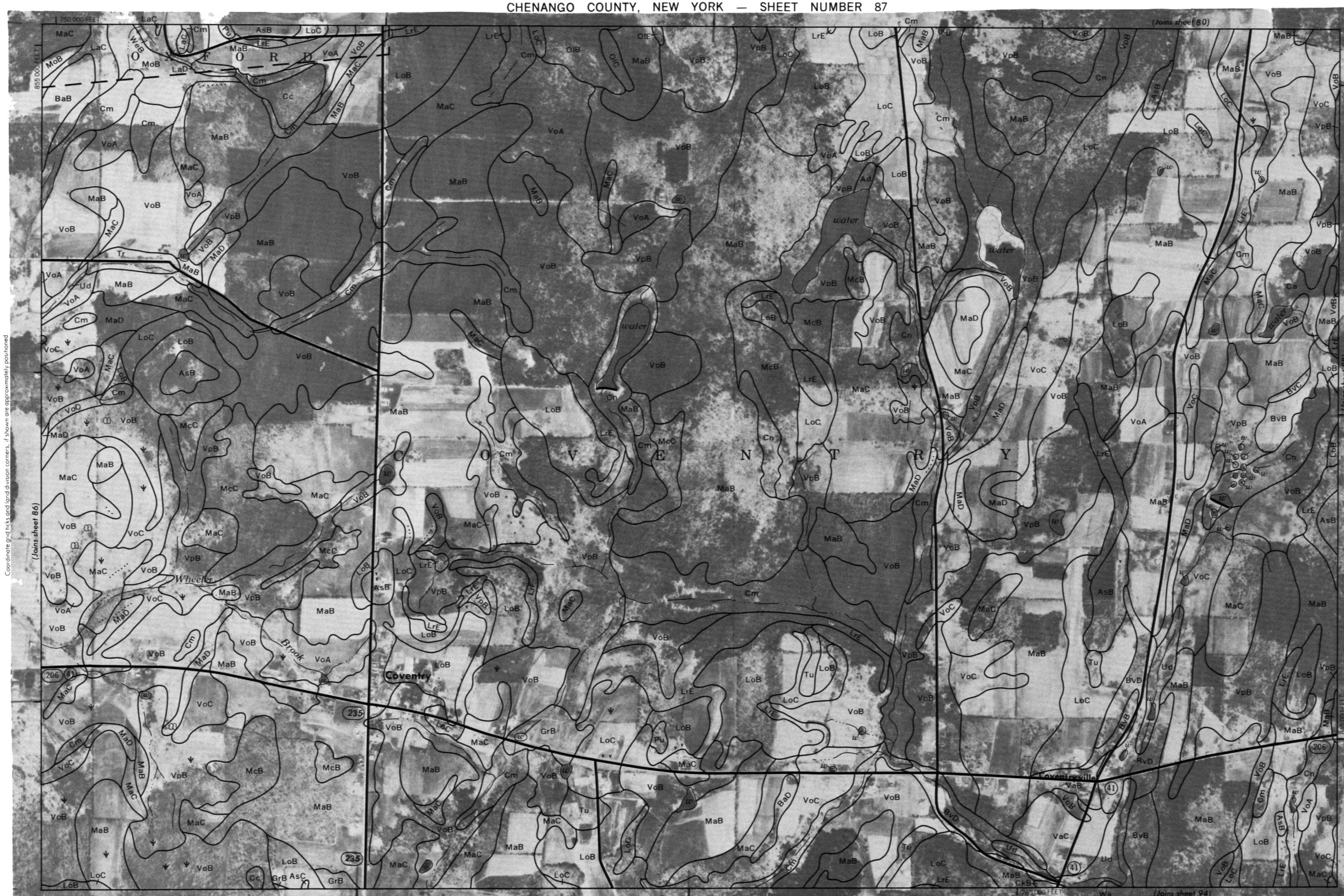
0 | ¼ | ½ | ¾ | 1

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

87

CHENANGO COUNTY, NEW YORK NO. 87

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.



N

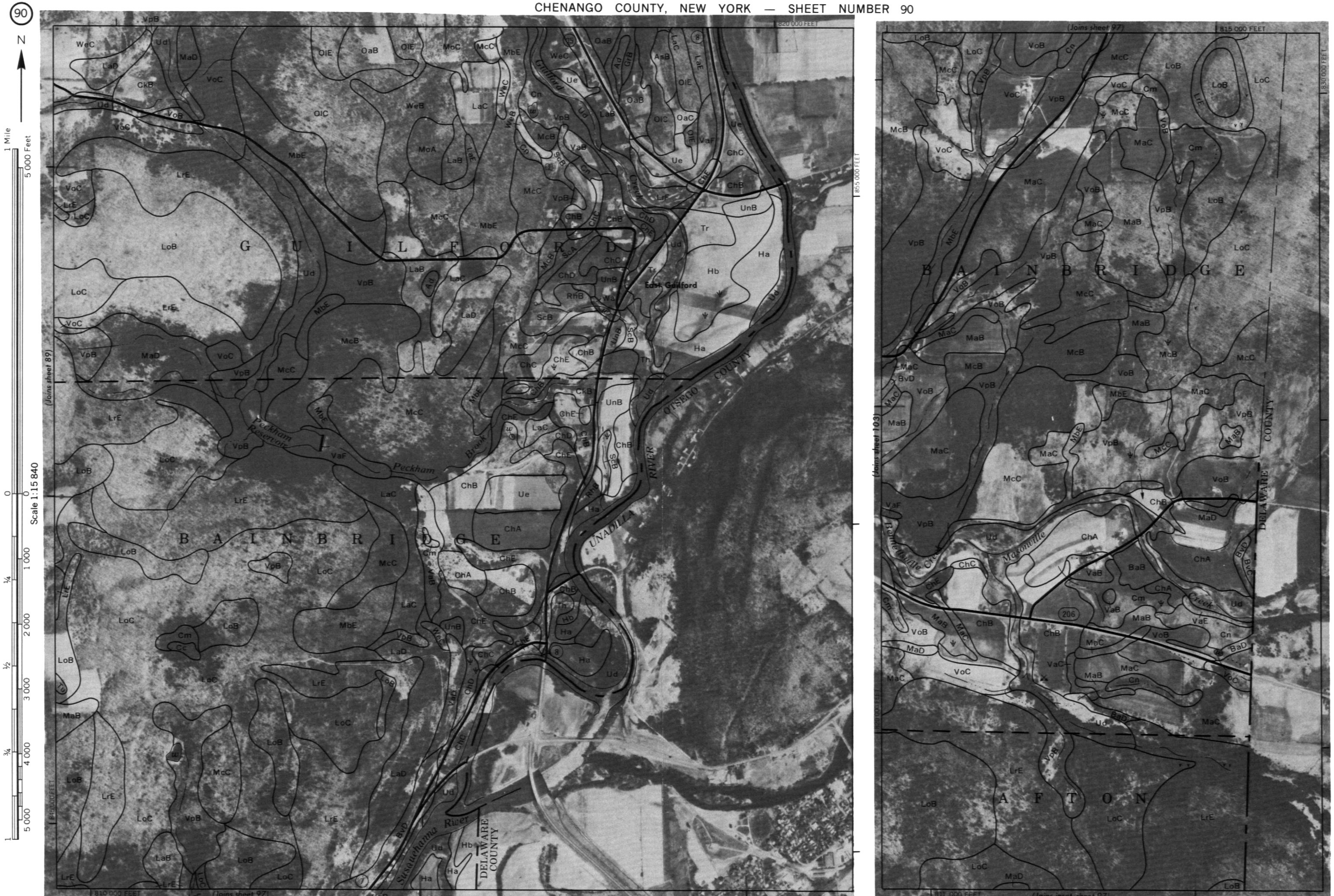
Scale 1:15 840

1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

CHENANGO COUNTY, NEW YORK NO. 89

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.



This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK NO. 90

CHENANGO COUNTY, NEW YORK NO. 91

This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

N

1 Mile
5 000 Feet
Scale 1:15 840
0 ¼ ½ ¾ 1
0 1000 2000 3000 4000 5000

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned

93

N

Scale 1:15 840

1 Mile

5 000 Feet

CHENANGO COUNTY, NEW YORK NO. 93

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.

Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 94

N

1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000
0
¼
½
¾
1
Scale 1:15 840

This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

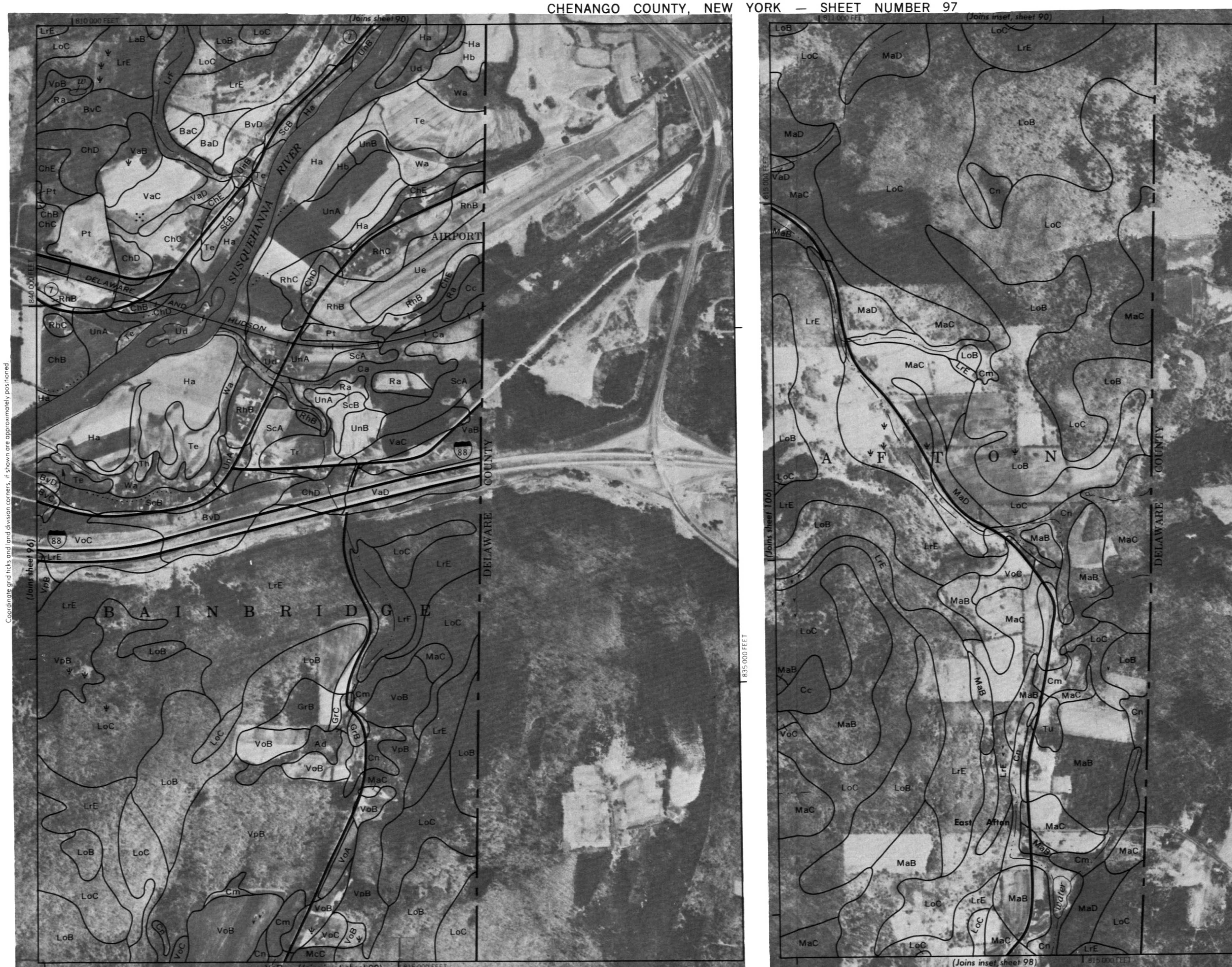
CHENANGO COUNTY, NEW YORK NO. 94

This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 96

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK NO. 96



CHENANGO COUNTY, NEW YORK NO. 97

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

N

1 Mile — 5 000 Feet

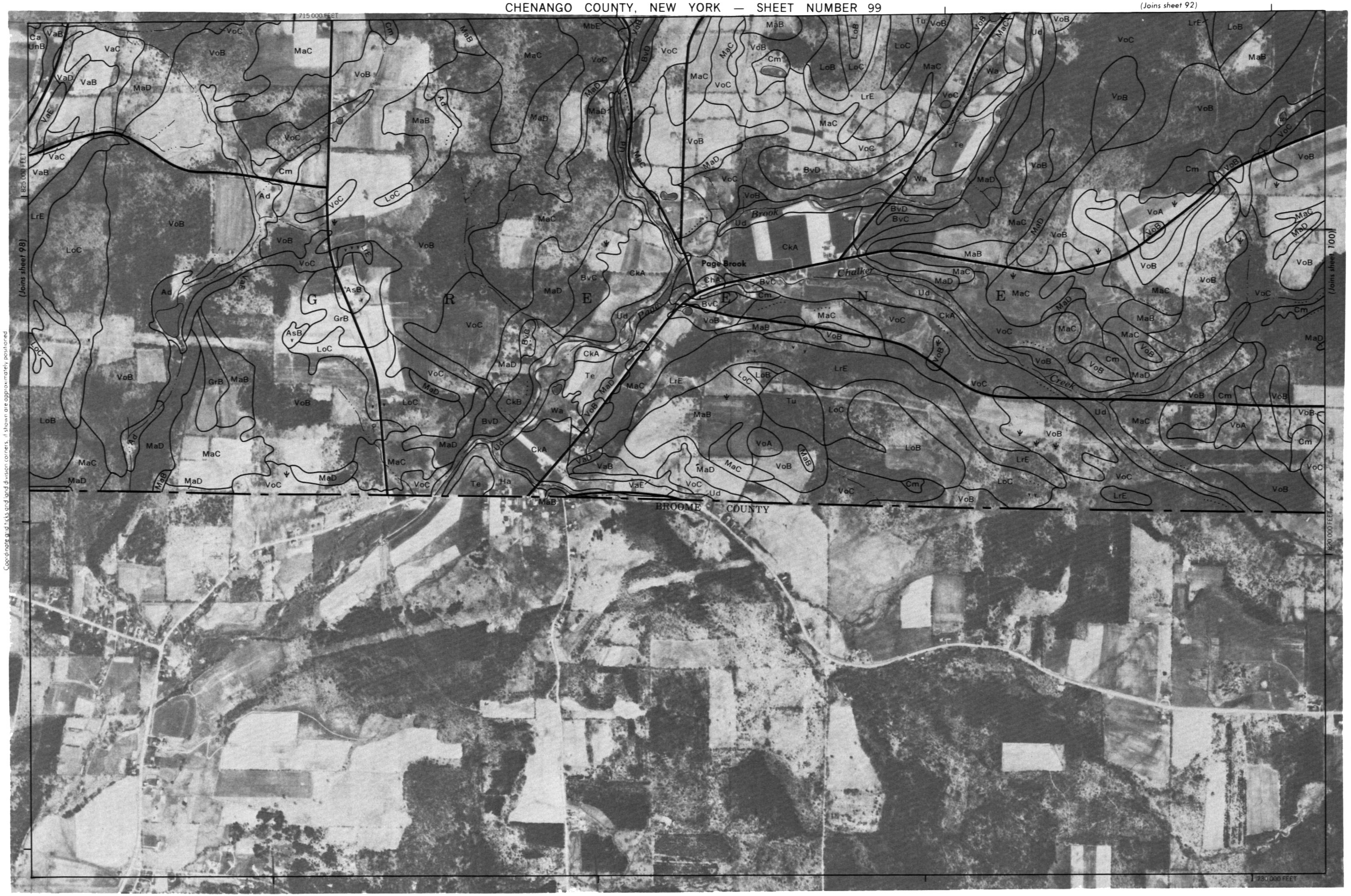
Scale 1:15 840

0 — 1000 — 2000 — 3000 — 4000 — 5000 Feet

0 — ¼ — ½ — ¾ — 1 Mile

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 98

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



Scale 1:15 840

1 Mile

5 000 Feet

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

CHENANGO COUNTY, NEW YORK NO. 99

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 100

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK NO. 100

CHENANGO COUNTY, NEW YORK NO. 101

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 102

N

1 Mile
5 000 Feet
Scale 1:15 840
0 ¼ ½ ¾ 1
0 1 000 2 000 3 000 4 000 5 000

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK NO. 102

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 103

CHENANGO COUNTY, NEW YORK NO. 103

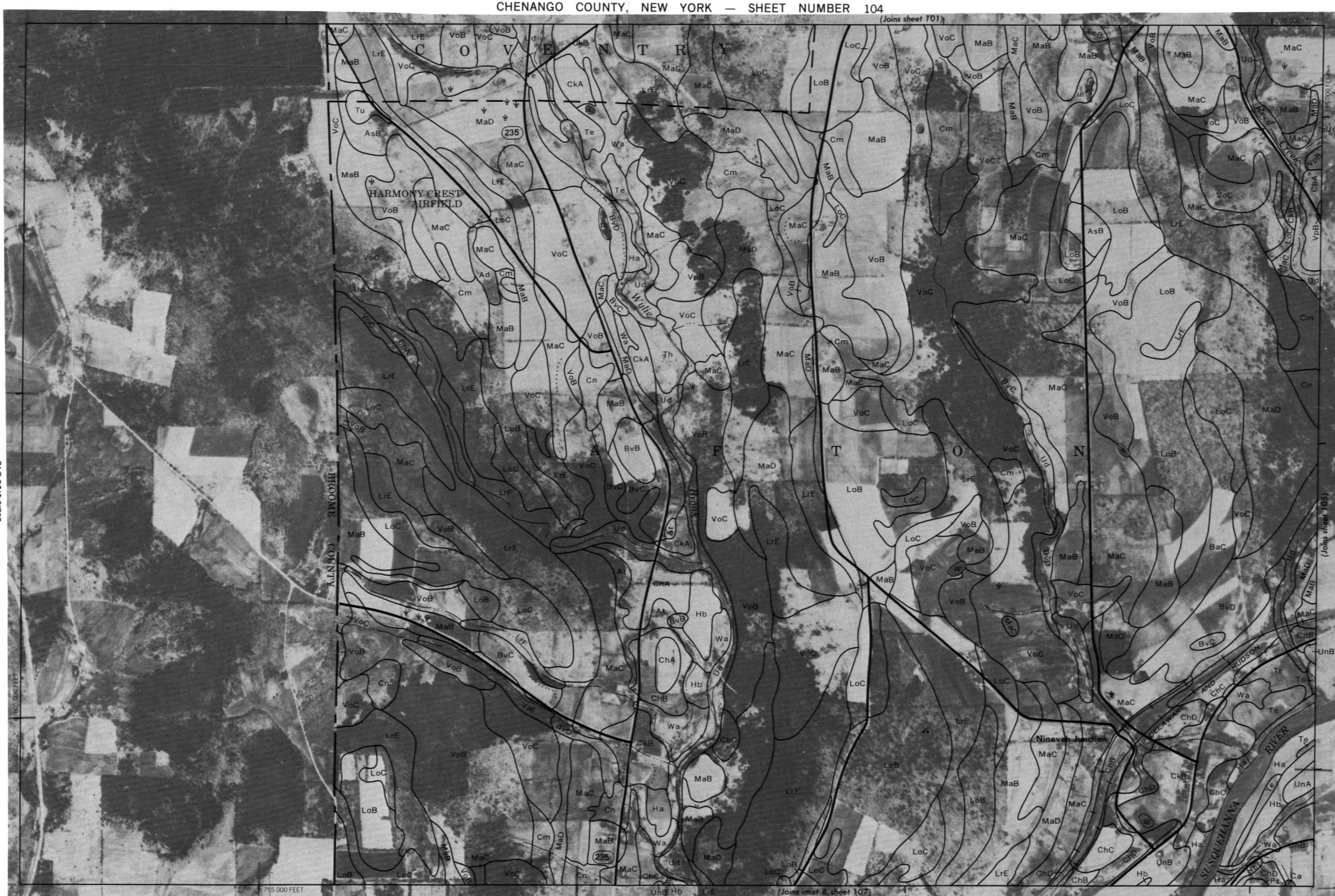
This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

N

1 Mile

5 000 Feet

Scale 1:15 840



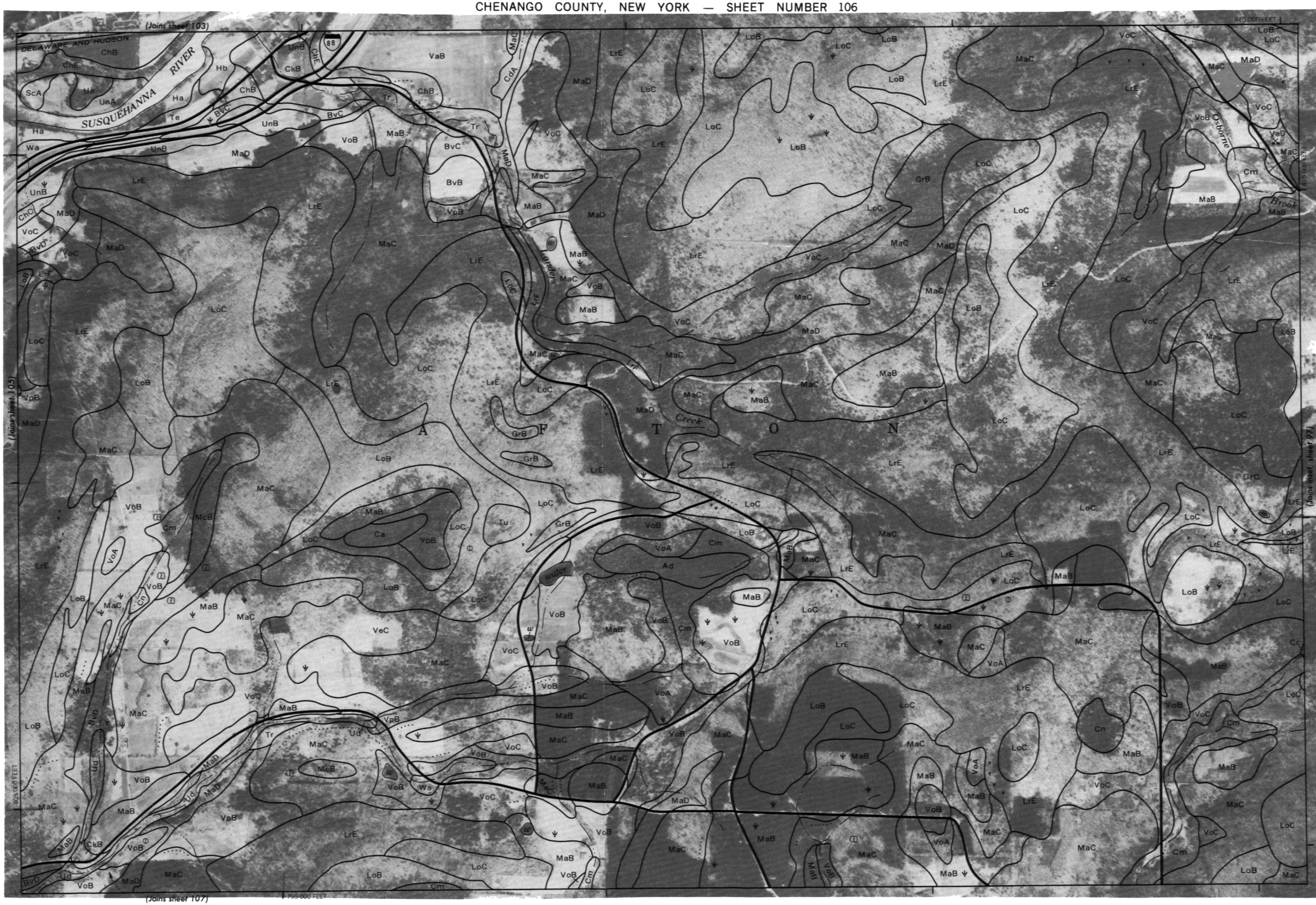
This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

105

CHENANGO COUNTY, NEW YORK NO. 105

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 106



This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.

CHENANGO COUNTY, NEW YORK NO. 106

CHENANGO COUNTY, NEW YORK — SHEET NUMBER 107

CHENANGO COUNTY, NEW YORK NO. 107

This map is compiled on 1974 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned.